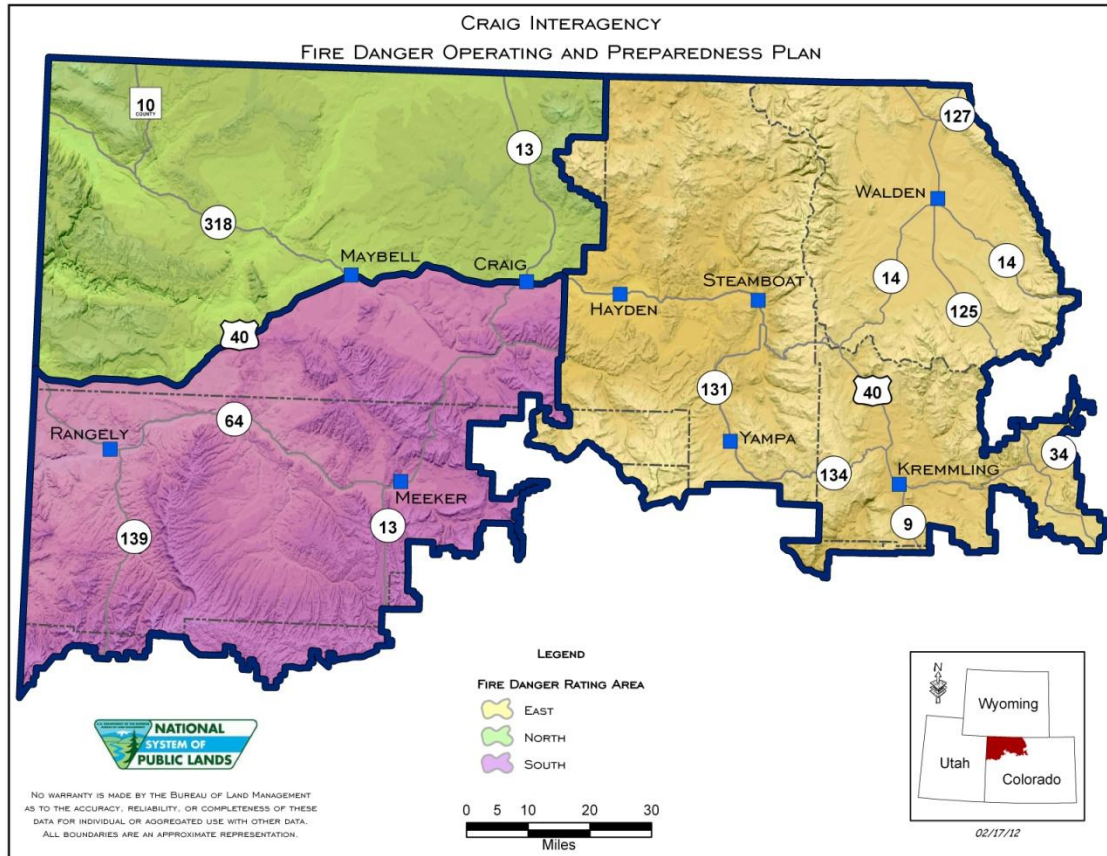


Craig Interagency Fire Danger Operating and Preparedness Plan



**Bureau of Land Management
Fish and Wildlife Service
State of Colorado
National Park Service (Adjective Rating Only)
USDA Forest Service (Adjective Rating Only)
Spring of 2012**



Craig Interagency

Fire Danger Operating and Preparedness Plan

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Table of Contents

Introduction.....	4
Objectives	5
Inventory and Analysis	5
Fire Problem Analysis.....	6
Fire Danger Rating Areas	9
Weather Analysis	13
Special Interest Groups (SIGs)	14
Fire and Weather Analysis.....	14
Fire History	14
Fire Danger Decision Levels	17
Operations and Applications.....	22
Preparedness Level	24
Dispatch Level	27
Adjective Fire Danger Rating	28
Seasonal Risk Analysis	29
Thresholds (EXTREME FIRE DANGER).....	30
Fire Danger Pocket Cards	31
Roles and Responsibilities	32
Program Improvements.....	34
Drawdown Levels	35
Appendix A - Team Members	36
Appendix B - Primary Distribution List	37
Appendix C – Glossary	38
Appendix D – WIMS User ID’s	42
Appendix E – Fire Family Plus Working Sets	43
Appendix F – Weather Station Data Analysis	45
Appendix G – Preparedness Level Actions	47
Appendix H – Pocket Cards	55
Appendix I--Weather Station Catalogs	57
Appendix J—Fire Family Plus Decision Points	58
Appendix K—Fire Occurrence (by Agency)	64
Appendix L –Maps	67
Appendix M--NFDRS Structure	71
Appendix N—BLM State Director Severity Request Procedures	72

Introduction

This plan is intended to document a decision-making process for agency administrators, fire managers, dispatchers, agency cooperators, and firefighters by establishing agency planning and response levels using the best available scientific methods and historical weather/fire data.

An appropriate level of preparedness to meet wildland fire management objectives is based upon an assessment of vegetation, climate, and topography utilizing the National Fire Danger Rating System (NFDRS) modeling. This plan combines an Operating Plan with a Preparedness Plan for four of the five primary wildland fire management agencies responsible for wildland fire management in Northwestern Colorado (BLM, FWS, State of Colorado and NPS).

This Fire Danger Operating Plan (FDOP) documents the establishment and management of the NWCFMU Interagency fire weather system and incorporates NFDRS fire danger modeling into fire management decisions.

This plan also outlines procedures for developing seasonal risk analysis and defines fire prevention action items by providing the direction necessary to convey fire danger awareness especially of escalating fire potential, to fire management personnel.

Guidance and policy for development of a Fire Danger Operating and Preparedness Plan can be found in the *Interagency Standards for Fire & Aviation Operations* (Red Book), *Wildland Fire and Aviation Program and Management and Operation Guide* (Blue Book), and *Forest Service Manual 5120*.

On July 6, 1994, the South Canyon Fire resulted in the deaths of 14 firefighters in Colorado. In 1995, an Interagency Management Review Team for the South Canyon Fire charged the National Advisory Group for Fire Danger Rating with developing “an implementation plan to improve technical transfer of fire danger technology.” On July 10, 2001, four firefighters lost their lives on the Thirtymile Fire in Washington. The Thirtymile tragedy prompted an Accident Prevention Plan which contained specific actions to enhance firefighter safety, including the need to identify thresholds for critical fuels and weather conditions that lead to extreme burning conditions and publishing these on pocket cards for use by firefighters. On July 22, 2003, two firefighters lost their lives in the Cramer Fire in central Idaho. OSHA levied serious violations which included the failure to recognize fire danger thresholds for large fires and respond accordingly. In addition, a Remote Automated Weather Station (RAWS) near the fire had not received maintenance and calibration before the start of the fire season. This plan addresses action items identified in these tragic fires by providing the direction necessary to convey fire danger awareness especially of escalating fire potential to fire management personnel. This awareness is critical when wildland fire danger levels exceed thresholds which may significantly compromise safety and control.

Objectives

- ◆ Provide a tool for agency administrators, fire managers, dispatchers, agency cooperators and firefighters to correlate fire danger with appropriate fire business decisions in Northwestern Colorado.
- ◆ Delineate Fire Danger Rating Areas (FDRA's) in northwestern Colorado with similar climate, fuels and topography.
- ◆ Establish a fire weather monitoring network consisting of RAWs, which comply with *NFDRS Weather Station Standards* ([PMS 426-3](#)).
- ◆ Determine fire business thresholds using Weather Information Management System (WIMS), National Fire Danger Rating System (NFDRS), Fire Family Plus software and by analyzing historical weather and fire occurrence data.
- ◆ Ensure that agency administrators, fire managers, cooperating agencies, industry/commercial entities, and the public are notified of the potential fire danger.
- ◆ Provide guidance to interagency personnel outlining specific daily actions to take at each Preparedness Level.
- ◆ Identify seasonal risk analysis criteria and establish general fire severity thresholds.
- ◆ Develop and distribute fire danger pocket cards to all personnel involved with fire suppression activities within the NWCFCMU Fire Danger Rating Area.
- ◆ Identify program needs and suggest improvements for the Fire Danger Operating and Preparedness Plan.
- ◆ Define roles and responsibilities in making fire preparedness decisions, managing weather information, and briefing suppression personnel regarding current and potential fire danger.

Inventory and Analysis

In order to apply a system that will assist managers with fire management decisions, the problems must be inventoried and analyzed to determine the most appropriate system that will adequately address the issues.

Involved Parties

This plan will affect a wide range of entities that can be grouped into three major categories:

- ◆ **Agency:** Employees of the Federal, State and local governments involved in the cooperative effort to assist with wildland fires. These include BLM, FWS, NPS, and State of Colorado employees, along with relevant volunteer fire departments.
- ◆ **Industry:** Organizations that either utilize the natural resources or have permitted activities on Federal, State or private wildland for commercial purposes. These entities or activities include ranchers, wilderness camps, railroads, utility

companies, mines, timber harvesting, filming, building construction, oil and gas, etc.

- ◆ **Public:** Individuals who use the land for recreational purposes such as off-highway vehicle (OHV) use, camping, hunting, hiking, fishing, skiing, firewood gathering, mountain biking or general travel. This group also includes those living within the wildland/urban interface (WUI).

Fire Problem Analysis

The following table demonstrates the differences between the target groups (agency, industry, and public). The ability to regulate, educate, or control a user group will be based upon the interface method and how quickly they can react to the action taken. In addition, each action will result in positive and/or negative impacts to the user groups. Consequently, the decision tool which would be most appropriate would depend upon the sensitivity of the target group to the implementation of the action. In selecting a component and/or index, several factors must be considered:

1. Problem/Issue: This is the problem specific to the area of concern and includes ignition causes. The problem is “framed” to focus on the wildland fire management issue, such as the point when fire activity becomes a burden to the local suppression forces.

2. Management Action (Application): This is the decision(s) which will affect the public, industry, or agency personnel. This includes fire management applications which can be used to formulate decisions regarding the potential issues which have been identified for the specific area. Management actions represent a way to link fire danger information with fire management decisions which affect specific target groups. Consider the appropriate set of decision thresholds to address the issue (i.e., Dispatch Level, Staffing Level, Preparedness Level, Adjective Rating, Public/Industrial Restrictions, etc.).

3. Target Group: The group of people commonly associated with the problem (agency, industry, or public).

4. Degree of Control: This is a general description of how much control the agencies have over these entities (High Low) and how quickly a target group can respond to management actions.

5. Communication: Forms of communication used with the user group (face-to-face, radio, telephone, email, newspaper, television, signing/posting, text-messaging, etc.).

6. Potential Impacts: The potential impacts on the target group and the likely consequences of a good (or bad) decision.

7. Component/Index: Sensitivity of the NFDRS outputs should be consistent with the ability to react (or communicate) to the target group. Memory and variability of the selected component or index must be understood to appropriately match the task and user group. If a situation where control and ability to communicate with the target group is high, the component and/or index which would be most appropriate should also be highly reactive to changing conditions (i.e., Ignition Component, Spread Component). If the situation was reversed where the control and ability to communicate with the target group is low, the appropriate component and/or index should not vary significantly over time (i.e., Energy release Component).

Fire Problem Analysis Chart

Problem	Management Action (Control Mechanism)	Target Group			Degree of Control	Communication	Potential Impacts	Decision Tool
		Agency	Industry	Public				
Unattended (and escaped) Campfires around recreation sites	Fire Restrictions (web, radio, newspaper) Roadside Prevention signs based on Adjective Rating Level	FWS BLM NPS State of Colorado		Campers Picnickers	Moderate	Communicated by Dispatch Center staff once per day to agency personnel for implementation. The intent is to raise the awareness of potential fire danger in simple, easy to communicate terms via local radio, newspaper, "Smokey's Arm" sign at the entrance to developed recreation areas.	Public Anger and Resistance Loss of Credibility LEO, recreation, and fire patrol workload	Energy Release Component & Adjective Rating
Unattended (and escaped) Campfires	Roadside Prevention Signs based on Adjective Rating Level LEO patrols	Interagency FWS BLM NPS			Low	Communicated by Dispatch Center staff daily to agency personnel for implementation. Prevention personnel must be notified to change signs.	Educ/Mitigation Workload LEO Workload Agency Prevention Costs vs. Suppression Costs	Energy Release Component
Fires caused by downed power lines during periods of high wind events	Modify daily operational activities based on Adjective Rating Level	Dispatch Center	Power Companies		Moderate	Dispatch Center staff retrieves the forecasted fire danger from WIMS and communicate this information to Duty Officers. Duty Officers then work with Educ/Mitig personnel to communicate with Power companies.	Loss of Productivity Loss of Credibility Socio-Economic	Burning Index
Suppression resources committed to multiple fires	Preposition resources based on Dispatch Level	Dispatch Center			High	Dispatch Center staff retrieves the actual and forecasted fire danger indices from WIMS and orders/releases resources based upon the Step-up Plan and ZFMO and Duty Officer input.	Staffing Cost vs. Suppression Cost	Burning Index
Initial fire response with little or no information available	Initial Response Plan based upon Dispatch Level and Dispatch Area	Dispatch Center			High	Dispatch Center staff retrieves the actual or forecasted fire danger indices from WIMS and dispatches pre-attack plan resources to reported fire based on dispatch level/zone.	Agency Costs vs. Suppression Costs	Burning Index
Suppression resources unavailable after work hours and/or on scheduled days off	Extended Staffing based on Preparedness Level	Dispatch Center			High Moderate	Dispatch Center staff retrieves the actual or forecasted fire danger indices from WIMS and notifies Duty Officer(s). Duty Officer notifies respective agency personnel via telephone or radio.	Public Anger and Resistance Loss of Credibility LEO/fire patrol workload	Energy Release Component
Fires resulting from fuelwood cutting activities	Modify daily operational activities based on Adjective Rating Level		Loggers	Wood Cutters	Low	Permit stipulations. Post adjective fire danger via web, newspaper, radio. Fire prevention patrolling for face-to-face communication and enforcement.	Public Anger Loss of Credibility LEO recreation, and fire patrol workload	Energy Release Component

Fire Danger Rating Areas

Fire Danger Rating Areas are geographic areas relatively similar in climate, fuels, fire occurrence and topography within which the fire danger can be assumed to be relatively uniform. The Craig Interagency Fire Danger Planning Area has three FDRA's. They are identified as the North, South and East Zone FDRA's. The North Zone encompasses all of Grand Junction fire weather zone [200](#) while the South Zone encompasses all of weather zone [202](#). The East Zone contains weather zone [201](#), 030 and 032

North Zone FDRA (Weather Zone 200)

- ◆ **Location:** The North Zone FDRA primarily encompasses the Little Snake Field Office in northwest Colorado; however, the southwestern corner includes part of the White River Field Office and Dinosaur National Monument. The eastern boundary is the Moffat/Routt county line except where the Routt National Forest protrudes several miles into Moffat County. The southern boundary is US highway 40, with the western boundary being the Utah/Colorado border and the northern boundary being the Colorado/Wyoming border.
- ◆ **Fuels:** The eastern portion of the FDRA from approximately the Little Snake River east is dominated by rolling sagebrush rangelands with occasional juniper mesas and ridges. Wyoming big sagebrush is the dominant shrub with some basin big sagebrush in draw bottoms with deeper soils. Antelope bitterbrush is also common but has been reduced in extent by large fires that have occurred over the last 25 years. Other shrubs present include greasewood, rabbitbrush, winterfat, shadscale, fourwing saltbush, and mountain mahogany. Oakbrush, serviceberry, and snowberry are common at higher elevations particularly on north aspects. Dominant grasses include needleandthread, western wheatgrass, bluebunch wheatgrass, bluegrass, junegrass, and indian ricegrass. Cheatgrass, while common, is not continuous except for isolated areas. Common forbs that can be found in all areas of the FDRA include scarlet globemallow, lupine, buckwheat, arrowleaf balsamroot, lupine, vetches, phloxes, asters, daisies, clover, penstomons, and many other less common species. Fire frequency is lower in this portion of the FRDA but experiences the largest fires due to fuel continuity.

The western portion of the FDRA from the Little Snake River west is approximately 50% pinyon/juniper woodlands, 25% sagebrush shrublands, 20% salt desert shrub, and 5% coniferous forest. Pinyon/juniper woodlands in this FDRA consists primarily Utah juniper. Pinyon pine occurs with more frequency as elevation increases or on more mesic sites. Moderate to old age pinyon juniper stands typically have very little understory; therefore fire spread is a function of canopy bulk density, wind and relative humidity. The amount of dead/down material can also affect fire spread as a result of spotting into this material. The sagebrush shrublands are similar to that described for the eastern portion of the FDRA although fuel continuity is typically less.

Much of the northern part of this portion of the FDRA is dominated by salt desert shrub in which there is essentially no fire occurrence. This community consists of nuttall's saltbush, shadscale, bud sage, several species of sagebrush, and most of the common grasses and forbs.

Two types of coniferous forests are present in relatively small areas. Ponderosa pine occurs along a narrow band running the length of Douglas Mountain. Most stands are mature or over-mature with pinyon, juniper, sagebrush, mountain mahogany, and other shrubs growing in the understory. Occasional fires occur in this forest type with some getting large mainly as a result of the surrounding fuel types. The second coniferous forest type is dense lodgepole pine found on Diamond Peak and Middle Mt. The majority of the area is an even aged stand with trees 4" to 8" d.b.h., 30' to 40' tall with little understory other than low to moderate amounts of dead/down material. Small aspen patches occur occasionally in and around this stand. Fire occurrence is infrequent due to the high elevation and associated increased precipitation.

- ◆ **Climate:** Hot and dry weather typically dominates the North Zone FDRA during fire season. This part of Colorado is considered arid high mountain desert. The temperatures rise to the high 90's, relative humidity drops to the lower teens, and wetting rain events are scarce. Summer weather patterns that affect the area are westerly and southwesterly flows. Westerly flows generally bring hot and dry air into the region with little or no precipitation. The main concern is when low-pressure systems or upper-level disturbances pass through the area with enough energy and moisture to initiate thunderstorm activity and erratic winds. Fire activity is frequent, and the potential for large fire growth is usually quite high. Southwesterly flows typically bring monsoonal moisture into the region. Fire frequency may increase due to additional thunderstorm activity, but fire growth potential could be lower due to increased moisture. Fires in this FDRA are typically in climate class 1 (Arid/Semi-arid).
- ◆ **Topography:** The North Zone FDRA consists of rolling hills with an elevation range between 5800' and 7000' with slopes of less than 25%. More mountainous areas with steeper slopes occur around Dinosaur National Monument (DNM), the extreme eastern side, and in the very northwest corner of the FDRA. Elevation ranges from 6500' to 8500' around DNM and the east very eastern side, and 6500' to 9500' in the northwest corner.

East Zone FDRA

- ◆ **Location:** The East Zone FDRA covers lands within the eastern portion of the NWCFMU. The Northwestern border is the Park Mountain range, followed by the Gore mountain range to the Southwest. The southern border runs from State Bridge over to Winter Park Colorado. The east edge follows the Continental Divide up to Rocky Mountain National Park, then up the Medicine Bow Mountains, and over to the Laramie Mountains. The northern border is the Colorado/Wyoming State line. It primarily includes USFS and BLM administered lands, along with and scattered tracts of private/state lands administered by the counties and the State. Fish and Wildlife and National Park Service administered lands are also within the zone.
- ◆ **Fuels:** The valleys which include BLM, State and private lands consist mostly of North Park Sage Steppe, Middle Park Sage Steppe, and the Yarmony mountain area. North Park Sage Steppe is

found in Jackson County and Middle Park Sage Steppe is found in Grand County, Yarmony mountain area is located in the southwest portion of the zone.

North Park Sage Steppe: is a mixture of sagebrush with an understory of grasses and forbs. Prominent grasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), bluegrasses (*Poa* spp), fescues (*Festuca* spp), pine needlegrass (*Achnatherum pinetorum*), Indian ricegrass (*Achnatherum hymenoides*), and bottlebrush squirreltail (*Elymus elymoides*). Forbs include wild buckwheat (*Eriogonim* spp), daisies (*Erigeron* spp), phlox (*Phlox* spp), pussytoes (*Antennaria* spp), and beard tongues (*Penstemon* spp).

Middle Park Sage Steppe areas: Are dominated by dense over-aged sagebrush with an understory of native, cool season grasses and forbs. A few other shrubs such as snowberry (*Symphoricarpos* spp) and serviceberry (*Amelanchier alnifolia*) occupy the area. Prominent grasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), bluegrasses (*Poa* spp), fescues (*Festuca* spp), pine needlegrass (*Achnatherum pinetorum*), Indian ricegrass (*Achnatherum hymenoides*), and bottlebrush squirreltail (*Elymus elymoides*). Forbs include wild buckwheat (*Eriogonim* spp), daisies (*Erigeron* spp), phlox (*Phlox* spp), pussytoes (*Antennaria* spp), and beard tongues (*Penstemon* spp).

Yarmony Mountain area is dominated by pinyon-juniper woodlands, sagebrush/bunchgrass steppe, and mountain shrub plant communities. The sage species include Wyoming big sage, (*Artemisia rigidate*), Low sage (*Artemisia arbuscula*), and Fringed Sage (*Artemisia frigida*). Other mountain shrubs are mountain mahogany (*Cercocarpus betuloides*) and bitterbrush (*Purshia tridentate*). Perennial grasses on the project site are Indian ricegrass (*Acnatherum hymenoides*), bluebunch wheatgrass (*Pseudoregnaria spicata*), Idaho fescue (*Festuca idahoensis*), Squirreltail, (*Elymus elymoides*) and blue gramma (*Boutelous gracilis*). Forbs will vary from year to year in both species diversity and production.

Forested/upper elevations at about 8,000 feet the Sage Steppes' transition to a lodgepole pine/aspen forested areas, in these areas Serviceberry, Mountain Mahogany, Common Ground Juniper, and Bitterbrush can be found. At 9,000 feet elevation a transition to mixed conifers starts to occur, this includes lodgepole pine, sub-alpine fir, and Engelmann Spruce. Douglas fir can be found from 7,000 feet up in isolated stands in the Zone.

- ◆ **Climate:** The climate class ranges from high desert to alpine forest. Precipitation generally increases with elevation. Lower elevations typically receive 12-15 inches per year with higher peaks receiving up to 60 inches per year. February and April tend to be the wettest months while summer and early fall are typically the driest. Summer temperatures can rise to the low 90's at lower elevations and mid-80's at higher elevations. Predominate wind patterns during the fire season are southwest except where modified by local topography. Strong up-canyon winds cause control problems. Relative humidity can drop to the lower teens and occasionally into the single digits. Fires in this FDRA are typically in climate class 2 (Sub humid).
- ◆ **Topography:** The East Zone consists of 10 mountain ranges and two major watersheds. The northern area of the zone is mostly in Jackson County; this is made up of the Park Mountain Range to the west, the Rabbit Ears and Never Summer Ranges to the south, with the Medicine Bow Range to the east and the north, with the Laramie mountain range to the east. In the middle of

the area is an open valley with rolling hills and the North Platte River running through the upper third of the area. Most of the rivers and drainages run into the North Platte. The rivers and streams typically run to the north. The southern area of the zone is mostly Grand County; this is made up of the Gore Mountain Range to the east, the Williams Fork and Vasquez Mountains to the south, and the Front Range and Indian Peak Mountains to the east. The Northern area includes the Never Summer and Rabbit Ears Mountain ranges. The Colorado River runs through the middle of the area and then heads southwest as it goes by Kremmling, CO. On the east side, the Fraser River runs into the Colorado and the Williams Fork River runs into the Colorado about the middle of the southern areas, both the Fraser and the Williams Fork run in a northerly direction. The elevations range from 6,700 to 13,000 feet, with most of the valleys beginning at around 7,500 to 8,000 feet.

South Zone FDRA

- ◆ **Location:** The South Zone FDRA is geographically located within the southern portion of the NWCFMU. The southern end borders the Rio Blanco County line. The eastern edge is defined by Highway 13 in Rio Blanco County and the Moffat/Routt County border. The northern perimeter consists of Highway 40 from the Moffat/Routt County to the Colorado/Utah State Line. The western edge of the Zone is defined by the Colorado/Utah State Line. The Fire Weather Zone 202 encompasses over 2,000,000 acres and is generally described as a High Desert Climate.
- ◆ **Vegetation:** Lower elevations in the Zone are dominated by desert shrubs such as Greasewood, Four-Wing Saltbrush, Big Sagebrush, Rabbitbrush, and Shadscale. Grasses consist of Cheatgrass, Western Wheat, Needle and Thread, Wild Basin Rye, Indian Rice, Thickspike, Blue Basin Wheat, and June Grass. Pinyon Pine and Utah Juniper are intermittently scattered throughout the lower elevations and slopes with more dense populations on ridge tops. The valley bottoms and drainages comprise of mostly Big Sagebrush and extend to the ridge tops throughout the lower elevations. Cottonwoods, Russian Olive, and Salt Cedar co-exist along river corridors and small creek channels. Small pockets of Ponderosa Pine are located throughout the transitional elevations in the Zone. The upper elevation fuels consist of Big Sagebrush, Serviceberry, Mountain Mahogany, Gambel Oak, Bitterbrush, Aspen, and Douglas fir.
- ◆ **Climate:** Hot and dry weather typically dominates the North Zone FDRA during fire season. This part of Colorado is considered arid high mountain desert. The temperatures rise to the high 90's, relative humidity drops to the lower teens, and wetting rain events are scarce. Summer weather patterns that affect the area are westerly and southwesterly flows. Westerly flows generally bring hot and dry air into the region with little or no precipitation. The main concern is when low-pressure systems or upper-level disturbances pass through the area with enough energy and moisture to initiate thunderstorm activity and erratic winds. Fire activity is frequent, and the potential for large fire growth is usually quite high. Southwesterly flows typically bring monsoonal moisture into the region. Fire frequency may increase due to additional thunderstorm

activity, but fire growth potential could be lower due to increased moisture. Fires in this FDRA are typically in climate class 1 (Arid/Semi-arid).

- ◆ **Topography:** The South Zone is characterized by rolling hills and valleys. The eastern side of the zone is bordered by the White River National Forest and the southern border follows the Roan Plateau. Elevations range from 6000 to 9000 feet. The higher elevations occur along the southern and eastern borders.

Weather Analysis

Weather is one of the three components that determines fire behavior, and the most variable component, thus it is integral to determining fire danger. For this Plan, weather was analyzed using the data received from fourteen remote RAWS within the Craig Interagency Dispatch Area. The NWCFMU (BLM) manages ten active RAWS: Ladore, Great Divide, Calico, Independence, Gun sight, Dry Gulch, Pinto, Hunter Creek, Dragon Road and Ernie Gulch. All of these stations comply with NWCG NFDRS Weather Station Standards. The Dinosaur National Monument (NPS) manages the Dino Success RAWS while the Medicine Bow/Routt National Forest manages three stations within the area, Dry Lake Willow Creek and Porcupine. The White River National Forest manages the Dead Horse and Hangman RAWS. A map of the RAWS Station is in Appendix F.

Table 2. RAWS summary of active and inactive station within the FDRA's

Station ID	Station Name	Status	Agency/Owner	WIMS Data Years
050104	Ladore	Active	BLM-CO-CRD	1978-2011
050106	Great Divide	Active	BLM-CO-CRD	1985, 1998-2011
050108	Calico	Active	BLM-CO-CRD	2007-2011
050305	Independence	Active	BLM-CO-CRD	2009-2010
050404	Gun Sight	Active	BLM-CO-CRD	1964-1967, 1998-2011
050407	Dry Gulch	Active	BLM-CO-CRD	2009-2011
051402	Pinto	Active	BLM-CO-CRD	1972-1976, 1989-2011
051406	Hunter Creek	Active	BLM-CO-CRD	1984-2011
051407	Dragon Road	Active	BLM-CO-CRD	1984-2011
051408	Ernie Gulch	Active	BLM-CO-CRD	1984-2011

050105	Dino Success	Active	NPS-CO-DINO	1993, 1998-2011
050102	Dinosaur NM HQ	Inactive	NPS-CO-DINO	1964-2001
050207	Dry Lake	Active	FS-CO-MBR	1984-2011
050304	Willow Creek	Active	FS-CO-MBR	1984-2011
050406	Porcupine	Active	FS-CO-MBR	1984-2011
51608	Hangman	Active	FS-CO-WRF	2006-2011
51404	Dead Horse	Active	FS-CO-WRF	1984-2010

Special Interest Groups (SIGs)

RAWS located in different geographical locations with common sensitivity to NFDRS model inputs can be grouped together to form a SIG. Laura Megel along with the Grand Junction Weather Service developed a technique analyzing relative humidity, and temperature as the indicator of weather elements to help define fire climate zones for both the North and South FDRA's. RAWS with common modeling sensitivity have been grouped into SIGs for each FDRA.

Fire and Weather Analysis

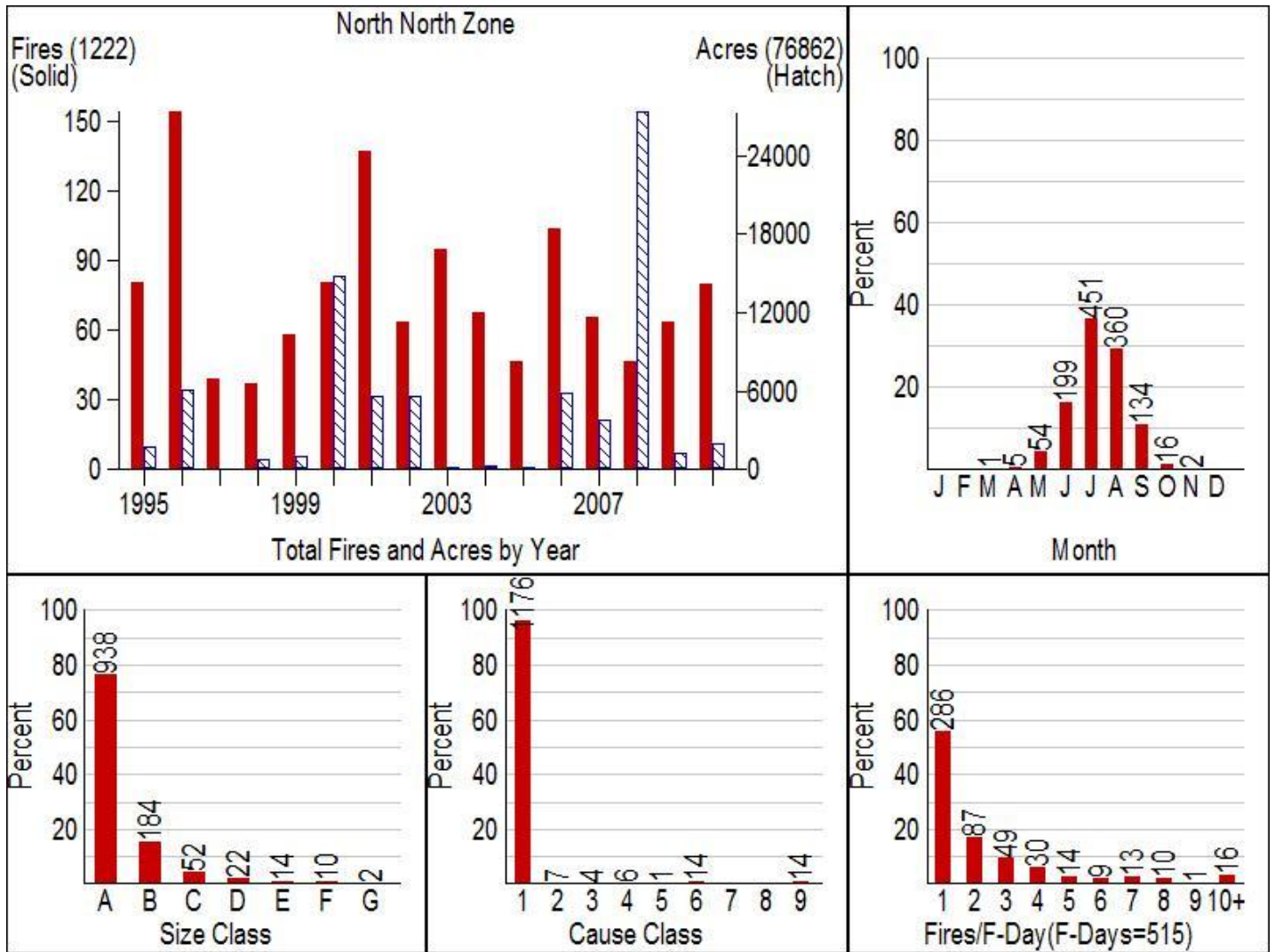
To get a better view of the interactions between weather and fire in the FDRA's, fire history, weather history and the relationship between historical fires and historical weather for each FDRA were analyzed using FireFamily Plus. Break points, or thresholds that correspond to a change in historical fire activity were also analyzed using Burning Index (BI) or the Energy Release Component (ERC) to create a Preparedness Level Break Point (based on ERC), Dispatch Level Break Point (based on BI), and Adjective Rating Level Break Point (based on ERC).

Fire History

The most recent fifteen years (1995-2010) of fire occurrence data was used for the statistical analysis. U.S. Department of Interior BLM, NPS, BIA, FWS fire occurrence data was obtained from the [Wildland Fire Management Information](#) System. Department of Agriculture Forest Service fire occurrence data was obtained from the National Interagency Fire Management Integrated Database (NIFMID) via [Kansas City Fire Access Software](#) (KCFASST). The State of Colorado fires will be added to future FDOP's. Since all four agencies may have reported the same fire in their respective databases, the fires were cross-referenced and duplicate fires were eliminated (in some instances, small fires are possibly duplicate). FireFamily Plus software was utilized to produce statistics and graphs. A more detailed fire occurrence workload analysis (by agency) is in Appendix K.

Graphs 1, 2 and 3 illustrate the fire history for the North, East and South Zone FDRA's. Graphs include acres burned by year, month of fire, fire size, fire cause and multiple fire days (days when more than one fire occurred). These graphs do not include state or county fires.

Graph 1. North Zone FDRA



Size Class:

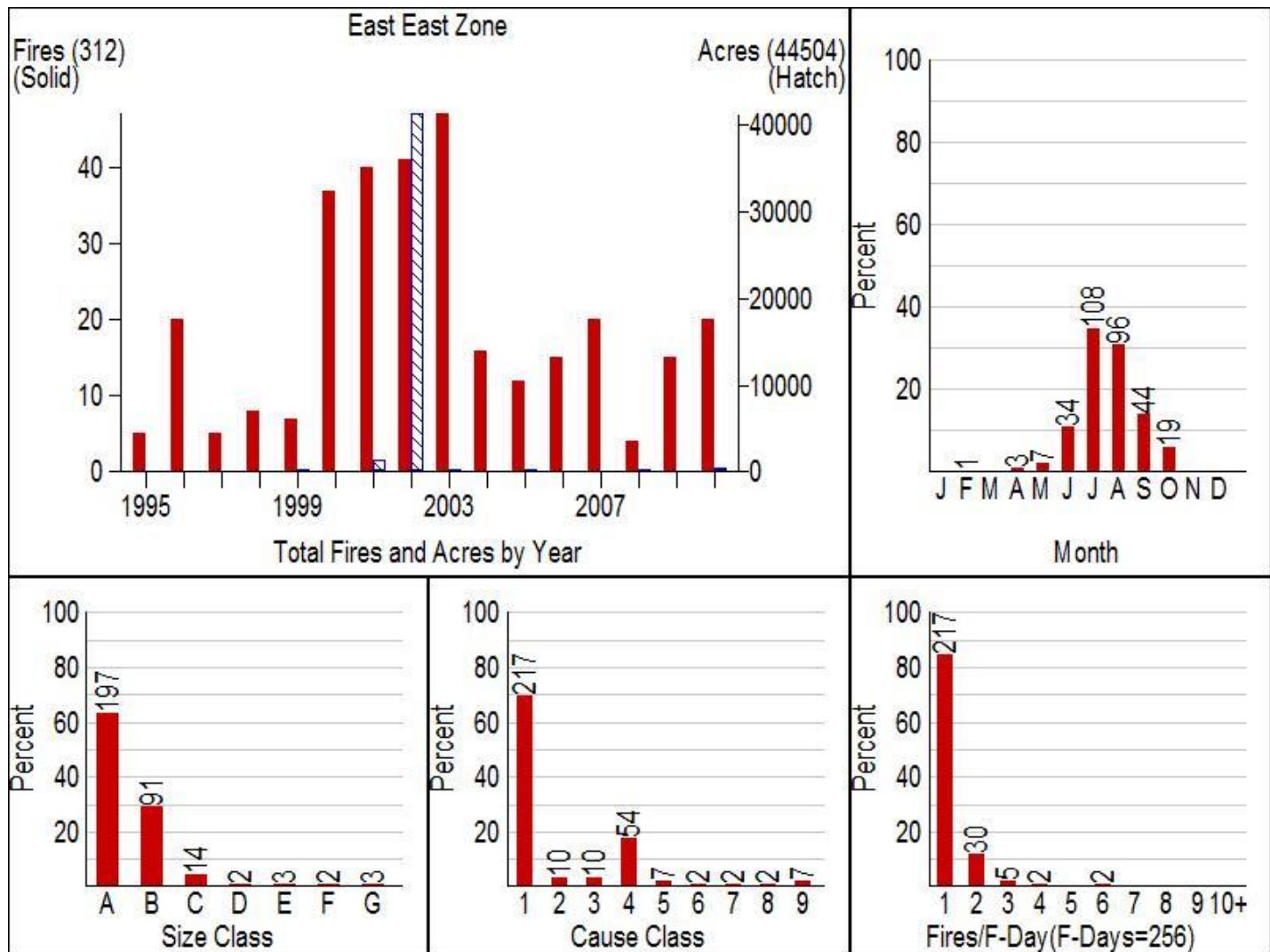
A = 0 - .2 acres
 B = .3 - 9 acres
 C = 10 - 99 acres
 D = 100 - 299 acres
 E = 300 - 999 acres
 F = 1000 - 5000 acres
 G = > 5000 acres

Cause Class:

1 = Lightning
 2 = Equipment
 3 = Smoking
 4 = Campfire
 5 = Debris Burning
 6 = Railroad
 7 = Arson
 8 = Children
 9 = Miscellaneous

Fires per Fire-day

Graph 2. East Zone FDRA



Size Class:

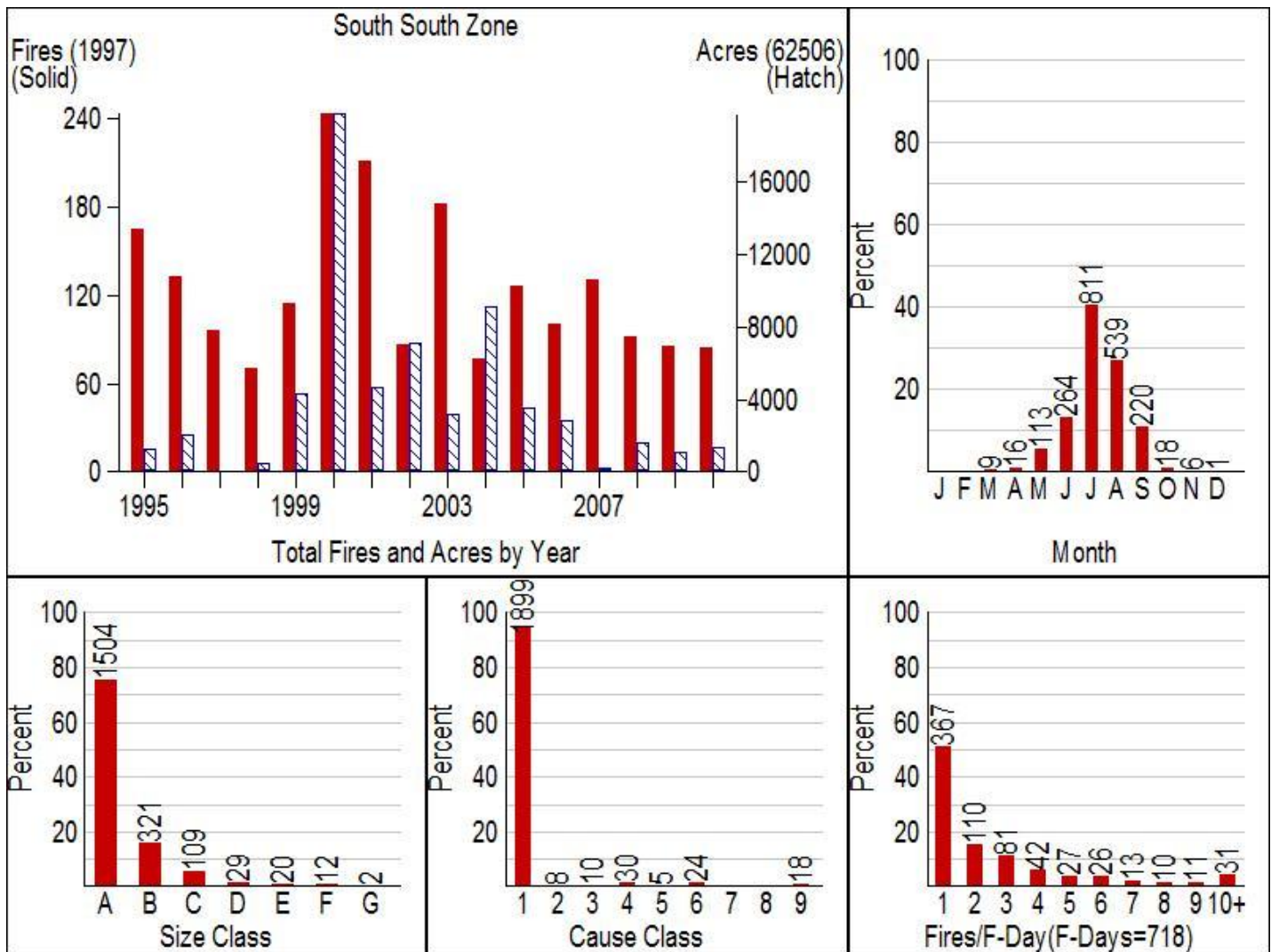
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Cause Class:

1 = Lightning
2 = Equipment
3 = Smoking
4 = Campfire
5 = Debris Burning
6 = Railroad
7 = Arson
8 = Children
9 = Miscellaneous

Fires per Fire-day

Graph 3. South Zone FDRA



Fire Danger Decision Levels

NFDRS utilizes the WIMS processor to analyze weather data and forecasted data stored in the NIFMID database to produce fire danger ratings for corresponding weather stations (RAWS). NFDRS outputs from the WIMS processor can be used to determine various levels of fire danger rating. The system is designed to calculate worst-case scenario fire danger. NFDRS will be utilized in three ways for the purpose of this plan: 1) To determine the **Preparedness Level**, which will help agency personnel determine an appropriate state of readiness of suppression forces; 2) To determine the **Dispatch Level**, which is a function of Burning Index, and is a decision tool for dispatchers to assign initial attack resources to reported fires; and 3) To compute the **Adjective Fire Danger** for the purpose of communicating fire danger to public and industrial interests . (e.g. fire danger signs). Although not used for making fire business decisions, Climatological Percentiles are discussed in this section.

In order to determine the Preparedness Level, Dispatch Level and Adjective Fire Danger, “break points” for each need to be calculated. Preparedness Level Break Points are thresholds that correspond to

changes in historical fire activity based on a correlation of ERC and historical fires (termed “fire business”). Dispatch Level Break Points correspond to changes in historical fire activity based on BI and historical fires (fire business), and Adjective Fire Danger Rating (AFDR) Break Points are based on staffing classes (divisions of fire danger) and ERC. Preparedness Level Break Points differ from AFDR Break Points in that they take fire history into account in addition to weather data.

The FireFamily Plus software package was used to establish the fire business breakpoints. A statistical analysis based on historical weather adjusted for fire activity determines the appropriate staffing index and associated break points for each FDRA. Refer to Appendix K for information regarding the Firefamily Plus analysis.

- **Preparedness Level Break Points:** Table 3 details the break points and items analyzed for the three FDRA's. The final Preparedness Level determination will also incorporate fire activity, live fuel moistures in the sagebrush and ERC's. Daily index/component values will be obtained from WIMS and used in Preparedness and Dispatch Level worksheets.

Table 3. Preparedness Level: Fire Family Plus Analysis Factors and Determinations							
Rating Area	RAWS	Data Years Available	Weight Factor	Fuel Model	NFDRS Index	Fire Business Break Point Ranges	
North Zone	SIG:					PL 1	00 – 40
	Calico	2007 - 2010	1	G	ERC	PL 2	41 – 60
	Dino Success	1998 - 2010	1			PL 3	61 – 74
	Great Divide	1998 - 2010	1			PL 4	75 – 84
	Lodore	1995 – 2010	1			PL 5	85 +
East Zone	SIG:					PL 1	00 – 32
	Dry Gulch	2009 - 2010	1	G	ERC	PL 2	33 –44
	Dry Lake	1995 - 2010	1			PL 3	45 –54
	Gun Sight	1998 - 2010	1			PL 4	55–64
	Independence	2009 - 2010	1			PL 5	65 +
	Porcupine	1995 - 2010	1				
	Willow Creek	1995 - 2010	1				
	Dead horse	1984-2010	1				
	Hangman	2006-2010	1				
South Zone	SIG:					PL 1	00 – 43
	Dragon Road	1995 - 2010	1	G	ERC	PL 2	44 – 59
	Ernie Gulch	1995 - 2010	1			PL 3	60 – 70
	Hunter Creek	1995 - 2010	1			PL 4	71 – 81
	Pinto	1995 – 2010	1			PL 5	82 +

- **Dispatch Level Break Points:** Table 4 lists the Dispatch Level Break Points and the factors included in the analysis.

Table 4. Dispatch Level: Fire Family Plus Analysis Factors and Determinations							
Rating Area	RAWS	Data Years Used	Weight Factor	Fuel Model	NFDRS Index	Fire Business Break Point Ranges	
North Zone	<u>SIG:</u>						
	Calico	2007 - 2010	1	G	BI	Low	00 – 48
	Dino Success	1998 - 2010	1			Moderate	49 – 72
	Great Divide	1998 - 2010	1			High	73+
	Ladore	1995 – 2010	1				
East Zone	<u>SIG:</u>						
	Dry Gulch	2009 - 2010	1	G	BI	Low	00 – 40
	Dry Lake	1995 - 2010	1				
	Gun Sight	1998 - 2010	1				
	Independence	2009 - 2010	1				
	Porcupine	1995 - 2010	1			Moderate	41 – 57
	Willow Creek	1995 - 2010	1				
	Dead horse	1984-2010	1				
	Hangman	2006-2010	1			High	58 +
South Zone	<u>SIG:</u>						
	Dragon Road	1995 - 2010	1	G	BI	Low	00 – 47
	Ernie Gulch	1995 - 2010	1			Moderate	48 – 74
	Hunter Creek	1995 - 2010	1			High	75 +
	Pinto	1995 – 2010	1				

Climatological Percentiles

Climatological breakpoints are points on the cumulative distribution of one fire weather/danger index computed from climatology without regard for associated fire occurrence/business. For example, the value of the 90th percentile ERC is the climatological breakpoint at which only 10 percent of the ERC values are greater in value. The percentiles for climatological breakpoints predetermined by agency directive are shown below. These percentiles are often used for agency severity requests

BLM - 80th and 95th percentiles

FWS - 90th and 97th percentiles

NPS - 90th and 97th percentiles

FS - 90th and 97th percentiles

It is equally important to identify the period or range of data analysis used to determine the agency percentiles. The percentile values for 12 months of data will be different from the percentile values for the fire season. Year round data should be evaluated for percentiles involving severity-type decisions.

Adjective Fire Danger Rating (AFDR)

The Adjective Fire Danger Rating will be used by agency personnel to inform the public of the current level of fire danger associated with a specific Fire Danger Rating Area. The amount of public interaction will depend on the magnitude of the adjective fire danger. Although NFDRS processors (such as WIMS) will automatically calculate the daily adjective class rating, the adjective rating will be averaged over seven days to create a smoothing effect. The daily adjective rating will be entered from WIMS then smoothed using a Microsoft Excel calculation.

Five staffing class intervals (1-5) that correspond with five levels of adjective fire danger (low, moderate, high, very high and extreme) will be used for all three FDRA's. Table 5, 6 and 7 illustrate the AFDR Break Points components for all three FDRA's.

Table 5. North Zone AFDR Break Points (1995-2010)

Input Information			Staffing Class and Percentile Break Points	
RAWS	Fuel Model	Staffing Index	90 th	97 th
Ladore 50104	G	ERC	93	99
Dino Success 50105	G	ERC	94	98
Calico 50108	G	ERC	84	89
Great Divide 50106	G	ERC	83	90

Table 6. East Zone AFDR Break Points (1995-2010)

Input Information			Staffing Class and Percentile Break Points	
RAWS	Fuel Model	Staffing Index	90 th	97 th
Independence 050305	G	ERC	65	75
Dry Lake 050207	G	ERC	72	78
Willow Creek 050304	G	ERC	68	75
Gunsight 050404	G	ERC	72	80
Porcupine 050406	G	ERC	53	61
Dry Gulch 050407	G	ERC	75	79
Dead Horse 051401	G	ERC	70	77
Hangman 051608	G	ERC	74	81

Table 7. South Zone AFDR Break Points (1995-2010)

Input Information			Staffing Class and Percentile Break Points	
RAWS	Fuel Model	Staffing Index	90 th	97 th
Pinto 51402	G	ERC	87	93
Dragon Road 51407	G	ERC	93	100
Ernie Gulch 51408	G	ERC	87	95
Hunter Creek 51406	G	ERC	86	95

Operations and Applications

Worksheets (flowcharts) will be used to determine the daily Preparedness and Dispatch Levels from the calculated break points. To reduce human error when completing the flowcharts, a self-calculating web based flowchart has been developed and will be posted on the Craig Interagency Dispatch web page.

The resultant Preparedness and Dispatch Levels for the different FDRA's will be broadcast in conjunction with the morning information report and documented on the daily resource status report. The Adjective Fire Danger Ratings will be broadcast and documented in the same manner.

Although fire danger ratings do not predict human-caused fires, a strong effort should be made to communicate the fire danger as it changes throughout the fire season. The social, political, and financial impacts of wildfires on agency, public, and industrial entities can be far-reaching. Loss of life, property, and financial resources can potentially be associated with any wildfire. As the fire danger fluctuates, agency personnel need to have pre-planned and appropriate responses. These actions should not only focus on appropriate fire suppression, but also mitigation/education.

WIMS Setup and Application

The Weather Information Management System (WIMS) is a comprehensive system that enables users to manage weather information.

WIMS can be accessed at <http://fam.nwcg.gov/fam-web/>. The WIMS User Guide can be downloaded from the following web site:

http://www.fs.fed.us/fire/planning/nist/wims_web_ug/wims_ug_complete061803.pdf

The following instructions explain how to create a SIG for each FDRA:

1. NSIG: Create a Special Interest Groups (SIG)


Enter SIG name (i.e., "Desert") and select

Setup

Enter the associated station numbers for the SIG. . . . then select

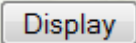
Save

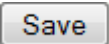
East Zone Sig

	Station
<input type="checkbox"/>	50207
<input type="checkbox"/>	50304
<input type="checkbox"/>	50305
<input type="checkbox"/>	50404
<input type="checkbox"/>	50406
<input type="checkbox"/>	50407
<input type="checkbox"/>	51404
<input type="checkbox"/>	51608

Repeat these steps until all three SIGs have been created.


2. EAVG: Assign NFDRS Weighted Avg.

Enter the SIG name and select 

By default, each station is weighted equally for the first priority fuel model. Keep the default value by selecting 

The following message will be displayed: Weighted average for sig “XXXXX” has been successfully updated

The East Zone SIG looks as follows:

	Station ID	Priority	Model Info	Weight Factor %
	50207	1		12
	50304	1		12
	50305	1		12
	50404	1		12
	50406	1		12
	50407	1		12
	51404	1		12
	51608	1		12

Preparedness Level

The Preparedness Level is a five-tier (1-5) fire danger rating system that will be based on Energy Release Component and indicators of fire business. The fire business indicators used to calculate the Preparedness Level include an indication of fire activity, Draw-down levels and live fuel moistures. A flow chart guides personnel through the process. Several procedures and guidelines are to be followed once the Preparedness Level has been determined. The break points for the Preparedness Level are set using an historical analysis (Fire Family Plus) of fire business and its relationship to 1300 RAWs observations entered into the NIFMID database and processed by WIMS, which calculates the staffing index values (BI, IC, SC, ERC, etc).

Worksheet Instructions:

Staffing Index Value: Place a checkmark in row one indicating the forecasted staffing index (ERC value). These indices (forecasted by the Grand Junction and Boulder/Denver Weather Offices) are based on the 1300 RAWs observations that are input to the WIMS processor by Craig Dispatch personnel.

Live Fuel Moisture: Place a checkmark in row two indicating the appropriate Live Fuel Moisture for the associated FDRA. Data can be obtained from the [National Fuel Moisture Data \(NFMD\) Sample Site](#).

North Zone FDRA-Sagebrush LFM: Average of the most recent samples from Great Divide, Rye Grass, Calico and Iron Springs Bench Sagebrush sites.

- Great Divide:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Great%20Divide&gacc=RMCC&state=CO&grup=Little%20Snake%20Field%20Office&sitefuel=site&display_type=Table%20Only%20Bi
- Rye Grass:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Rye%20Grass&gacc=RMCC&state=CO&grup=Little%20Snake%20Field%20Office&sitefuel=site&display_type=Table%20Only%20Bi
- Calico:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Calico&gacc=RMCC&state=CO&grup=Little%20Snake%20Field%20Office&sitefuel=site&display_type=Table%20Only%20Bi
- Iron Springs Bench:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Iron%20Springs%20Bench&gacc=RMCC&state=CO&grup=Dinosaur%20National%20Park&sitefuel=site&display_type=Table%20Only%20Bi

East Zone FDRA-Sagebrush LFM: Use Live Fuel Moistures for the North Zone

South Zone FDRA-Sagebrush LFM: Average of the most recent samples from Dragon Road, Crossroads and crooked Wash Sagebrush sites.

- Dragon Road:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Dragon%20Road&gacc=RMCC&state=CO&grup=White%20River%20Field%20Office&sitefuel=site&display_type=Table%20Only%20Bi
- Crossroads:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Crossroads&gacc=RMCC&state=CO&grup=White%20River%20Field%20Office&sitefuel=site&display_type=Table%20Only%20Bi

- Crooked Wash:
http://72.32.186.224/nfmd/public/site.php?site_fuel=Crossroads&gacc=RMCC&state=CO&grup=White%20River%20Field%20Office&sitefuel=site&display_type=Table%20Only%20Bi

Multiple Large Fire Activity: fire activity can be defined as any fire within the Craig Interagency Fire Dispatch Area (regardless of FDRA) that ~ requires the commitment of 50% of resources listed as available on the CRC daily resources status web page.

Preparedness Level Worksheet

Craig Interagency Fire Center

	ERC - Model G (North Zone FDRA)	0 - 40	41-60	61-74	75-84	85 Plus					
	ERC - Model G (East Zone FDRA)	0 – 32	33-44	45-54	55-64	65 Plus					
	ERC - Model G (South Zone FDRA)	0-43	44-59	60-70	71-81	82 Plus					
1	✓ ⇒	☐ ↙ ↘	☐ ↙ ↘	☐ ↙ ↘	☐ ↙ ↘	☐ ↙ ↘					
	LFM (%)-- Sagebrush	131-300 ↓	60-130 ↓	131-300 ↓	60-130 ↓	131-300 ↓	60-130 ↓	131-300 ↓	60-130 ↓	131-300 ↓	60-130 ↓
2	✓ ⇒	☐ ↓	☐ ↙ ↘	☐ ↙ ↘	☐ ↙ ↘	☐ ↙ ↘	☐ ↙ ↘	☐ ↓			
	Fire Activity	Yes or No ↓	No ↓	Yes ↓	No ↓	Yes ↓	No ↓	Yes ↓	No ↓	Yes ↓	Yes or No ↓
3	✓	☐ ↓	☐ ↓	☐ ↓	☐ ↓	☐ ↓					
	Preparedness Level	I	II	III	IV	V					

Dispatch Level

Agency personnel use the Dispatch Level (response level) to assign initial attack resources based on pre-planned interagency “Run Cards.” Combined with predefined Dispatch Zones which are currently the Fire Management Units (A through D polygons), the Dispatch Level is used to assign an appropriate mix of suppression resources to a reported wildland fire based upon fire danger potential. The Dispatch Levels is a two-tier fire danger rating system that is based on Burning Index and the current Preparedness Level. Burning Index is the most appropriate NFDRS index and/or component that correlate to fire occurrence. In all FDRAs, Burning Index (BI) in NFDRS Fuel Model G has been determined to be the best NFDRS index that statistically correlates to the potential for large fires to occur. Due to the ability of BI to reflect the most current fire danger potential, and the Dispatch Center’s ability to manage agency personnel throughout the course of any given day, Dispatch Level will be computed and implemented for initial attack response levels until a qualified Incident Commander arrives on scene to validate the need for the dispatched resources.

Dispatch Level Worksheet Craig Interagency Fire Center

FDRA	Burning Index				
BI - Model G (North FDRA)	0 - 48		49 - 72	73+	
BI - Model G (East FDRA)	0 – 40		41 – 57	58+	
BI - Model G (South FDRA)	0 - 47		48-74	75+	
	↓		↓	↓	
Preparedness Level	1-2	3-5	1-5	1-2	3-5
	↓	↓			↓
Dispatch level	LOW	Moderate			High

Adjective Fire Danger Rating

In 1974, the USFS, BLM and State Forestry organizations established a standard adjective description for five levels of fire danger for use in public information releases and fire prevention signage. For this purpose only, fire danger is expressed using the adjective levels and color codes described below.

Fire Danger Class and Color Code	Description
Low (L) (Green)	Fuels do not ignite readily from small firebrands, although a more intense heat source such as lightning may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but timber fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate (M) (Blue)	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
High (H) (Yellow)	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are hit hard and fast while small.
Very High (VH) (Orange)	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn in heavier fuels.
Extreme (E) (Red)	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

Agency personnel will use the resultant adjective fire danger information to maintain the awareness of public and industrial entities. The amount of interaction between agency and public/industry entities will depend on the magnitude of the adjective fire danger.

➤ Adjective Fire Danger Rating Determination

NFDRS processors automatically calculate the adjective class rating. The adjective rating calculations use the staffing index (such as ERC or BI) of the first priority fuel model listed in the station record in the processor.

The actual determination of the daily adjective rating is based on the current or predicted value for a user-selected staffing index and ignition component using the table below. The staffing index used in the plan is ERC.

Staffing Levels	Adjective Fire Danger Rating				
1-, 1, 1+	L	L	L	M	M
2-, 2, 2+	L	M	M	M	H
3-, 3, 3+	M	M	H	H	VH
4-, 4, 4+	M	H	VH	VH	E
5	H	VH	VH	E	E
Ignition Component	0-20	21-45	46-65	66-80	81-100

Given the same weather inputs, the NFDRS processor will calculate the adjective fire danger for selected fuel models.

Seasonal Risk Analysis

Seasonal risk analysis is a comparison of the historic weather/fuels records with current and forecasted weather/fuels information. Seasonal risk analysis is an on-going responsibility for fire program managers. The most reliable indicators of seasonal fire severity have been measurements of fine fuel loading, live fuel moisture, 1000-hour (dead) fuel moisture, and ERC. These levels will be graphically compared to historical maximum values and the average. The graphs will be routinely updated and distributed to fire suppression personnel and dispatch. Seasonal risk analysis information will be used as a basis for pre-positioning critical resources, dispatching resources, and requests for fire severity funding. The following are specific indicators that are useful in accurately predicting fire season severity and duration in the North, South and East Zone Fire Danger Rating Areas.

- ◆ **Fire Activity:** The presence (or absence) of fire activity can be tracked and compared to historical occurrences in order to anticipate severity conditions. The Fire Summary module of FireFamily Plus provides an efficient means to compare monthly fire activity.
- ◆ **Live Fuel Moisture:** Live woody (juniper) and herbaceous (sagebrush) fuel moisture plots were established in the North and South Zone FDRA, while live woody conifer and oak brush fuel moistures have been taken in the East Zone FDRA. Valuable data has been collected and a direct correlation has been drawn between fire intensity (controllability) and live moisture levels. Consequently, fire severity is determined by comparing current trends to historical averages. Comparison of fuel moisture to historical conditions at various locations within the Colorado and surrounding areas can be located

on the National Live Fuels Moisture web site:

http://72.32.186.224/nfmd/public/states_map.php?state=CO

- ◆ **NFDRS Indicators:** [ERC and 1000-hr](#) (3” – 8” diameter dead) fuel are used as the primary indicators to track seasonal trends of fire danger potential. NFDRS fuel model G has been chosen due to its good “fit” with the ERC and 1000-hour models. Other fuel models that might seem to be more appropriate due to their classification (grass/brush) do not correlate very well statistically with the NFDRS models. Consequently, fuel model G was chosen due to its ability to predict fire occurrence, specifically a day when a large fire is likely to occur.
- ◆ **Weather Trends:** Seasonal weather assessments rely upon long-range (30-90 day) forecasts. This information is available on the [NIFC Predictive Service Web Site](#). The site also contains daily and weekly fire danger assessments.
- ◆ **Drought Indicators:** The [Keetch-Byrum Drought Index](#) (KBDI) and [Palmer Drought Index](#) track soil moisture and have been tailored to meet the needs of fire risk assessment personnel. Current KBDI information is also located on the Rocky Mountain Web Site. Tracking and comparing 1000-hour fuel moisture is another method to assess drought condition
- ◆ **Normalized Difference Vegetation Index (NDVI):** [NDVI data](#) is satellite imagery, which displays vegetative growth and curing rates of live fuels. The [Wildland Fire Assessment System](#) provides several different ways to analyze current and historical greenness imagery, which can be a significant contributor to seasonal risk assessments.
- ◆ **Season-Ending Event:** Historical fire records were examined for both FDRA’s to determine the combination of weather parameters that would indicate the end of the fire season. The following season-ending events have been identified:
 - **North Zone FDRA:** three consecutive days when the ERC is less than 40 **and** measurable precipitation has occurred for at least a sum of 12 hours (**or** measurable precipitation has occurred for at least a sum of 25 hours) during that three-day period.
 - **South Zone FDRA:** three consecutive days when the ERC is less than 40 **and** measurable precipitation has occurred for at least a sum of 12 hours (**or** measurable precipitation has occurred for at least a sum of 25 hours) during that three-day period.
 - **East Zone FDRA:** three consecutive days when the ERC is less than 40 **and** measurable precipitation has occurred for at least a sum of 12 hours (**or** measurable precipitation has occurred for at least a sum of 25 hours) during that three-day period.

Thresholds (EXTREME FIRE DANGER)

Seasonal risk escalation in fuel complexes of the Craig Dispatch area relies upon a combination of factors that will ultimately trigger an extreme state of fuel

volatility and a high potential for large fire growth or multiple ignition scenarios. These factors are:

- ◆ **Fire Activity:** The occurrence of large/multiple fires is the best indicator of severity conditions and the potential for seasonal risk. Any one incident reaching type one or two complexity would be an indicator of severity. Two or more type three incidents within a two to four week period would also be a strong indicator. Three or more initial attack fires in the same day indicate a point where resources are scarce. A progressive approach to assessing seasonal risk will prepare the local unit for these occurrences and the necessary tools will already be in place.
- ◆ **Live Fuel Moisture (Juniper):** The average woody fuel moisture of juniper typically fluctuates between 100% (June) and 75% (August). Any readings below 80% indicate increased risk relating to large fire growth and severity conditions. Below average readings may indicate an early or extended fire season.
- ◆ **Live Fuel Moisture (Sagebrush):** The average herbaceous fuel moisture of sagebrush in the North and South Zone FDRA fluctuates between 200% (June) and 80% (August). Readings below 75% indicate increased risk relating to large fire growth and severity conditions. Below average readings may indicate an early or extended fire season.
- ◆ **NFDRS Thresholds:** The BI threshold for extreme fire potential is 73 (or higher) for the North and South Zone FDRA; the BI threshold for extreme fire potential is 58 (or higher) for the East Zone FDRA. It has been statistically proven that large fire events will occur proportionally more often when these thresholds are exceeded. The ERC threshold is 83 (or higher) for the North and South Zone FDRA and 65 (or higher) for the East Zone FDRA. Early and late-season readings that trend above average may indicate an extension of the normal fire season.
- ◆ **Drought Indicators:** Palmer Drought Index graphics display current drought conditions while KBDI values of 500-800 indicate the potential for rapid curing and drying of the fine fuels and potential for live fuel moisture to drop. The 1000-hour fuel moisture is also a good drought indicator. Values between six and ten percent indicate the potential risk for extreme burning conditions.
- ◆ **Normalized Difference Vegetation Index ([NDVI](#)):** An analysis of this imagery will assist in the assessment of current fuel moisture conditions and provide historical as well as average greenness comparisons.

Fire Danger Pocket Cards

The Fire Danger Pocket Card is a tool which can help fire suppression personnel to interpret NFDRS outputs and understand fire danger thresholds for a local area. Pocket cards can relate current NFDRS outputs with the historical average and

worst-case values in a specific geographic location. Visiting resources can use the pocket card to familiarize themselves with local fire danger conditions.

ERC is a measure of fire controllability (Deeming et al. 1978). NFDRS fuel model G was selected for all FDRA's as it provides the best statistical correlation with large fire occurrence and responds to changing weather and fuel conditions. Refer to Appendix H for pocket card examples.

Roles and Responsibilities

◆ Fire Danger Operating and Preparedness Plan

The NWCFMU FMO will ensure that necessary amendments or updates to this plan are completed. Updates to this plan will be made at least every two years and approved by the line officers (or delegates) from each agency. Revised copies will be distributed to the individuals on the primary distribution list.

◆ Suppression Resources

During periods when local preparedness levels are High to Extreme, the Fire Management Officers from each agency will strive to achieve the most efficient and effective organization to meet Fire Management Plan objectives. This may require the pre-positioning of suppression resources. The FMO/AFMO/ZFMO from each agency will also determine the need to request/release off unit resources or support personnel throughout the fire season.

◆ Duty Officer

For the purposes of this plan, a Duty Officer from each agency will be identified to the Craig Interagency Fire Center Manager. The Duty Officer is a designated fire operations specialist, who provides input and guidance regarding preparedness and dispatch levels. It is the Duty Officer's role to interpret and modify the daily preparedness and dispatch levels as required by factors not addressed by this plan. Modifications of the preparedness and/or dispatch levels must be coordinated through the Fire Center Manager. The Duty Officer will keep their respective agency's fire and management staff updated (as needed).

◆ Fire Weather Forecasting

Daily fire weather forecasts will be developed by the National Weather Service, Boulder/Denver and Grand Junction Weather Forecast Offices, and posted on the Internet and in WIMS for the Craig Colorado Interagency Fire Center to retrieve.

◆ **NFDRS Outputs and Indices**

The Center Manager will ensure that the daily fire weather forecast (including NFDRS indices) is retrieved and that the daily preparedness, dispatch, and adjective levels are calculated and distributed.

◆ **Risk Analysis Information**

The FMO from each agency will ensure that seasonal risk assessments are conducted during the fire season. The risk analysis will include information such as live fuel moisture, 1000-hour fuel moisture, fuel loading, NFDRS (BI/IC/ERC) trends, NDVI imagery, and other pertinent data. This information will be distributed to agency staff and the CRC Manager. The Center Manager and AFMO's will ensure information is posted at fire suppression duty stations.

◆ **Weather Station Maintenance**

The Remote Sensing Laboratory located at the National Interagency Fire Center (NIFC) maintains and calibrates the BLM RAWS stations on an annual basis. Local BLM Fire personnel are currently qualified as first responders to RAWS malfunctions. It is unknown who assists with maintaining and calibrating the USFS RAWS stations on an annual basis.

◆ **WIMS Access, Daily Observations, and Station Catalog Editing**

The BLM Center Manager is listed as the station owner for the BLM. The owner maintains the WIMS Access Control List (ACL). The station owner will ensure appropriate editing of the RAWS catalogs. The Center Manager will ensure the timely editing of daily 1300 weather observations of all stations.

◆ **Preparedness, Dispatch, and Adjective Level Guidelines**

Each agency's fire management staff along with the Center Manager will be responsible for establishing and reviewing the preparedness, dispatch, and adjective level guidelines on a bi-annual basis (as a minimum).

◆ **Public and Industrial Awareness**

Education and mitigation programs will be implemented by the agency Public Information Officers, Law Enforcement Officers, FMO's, AFMO's, Fire Wardens, and Prevention Specialists based on Preparedness Level Guidelines and direction provided by the agency's FMO and Duty Officer.

◆ **NFDRS and Adjective Fire Danger Break Points**

The FDOP team will review weather and fire data at least every two years (when the FDOP is re-analyzed). The team will ensure that the break points reflect the most accurate information with the concurrence of the FMO's.

◆ **Fire Danger Pocket Cards**

The FMO's will ensure that pocket cards are prepared at least every two years and are in compliance with NWCG standards. The cards will be distributed to all interagency, local and incoming firefighters and Incident Management Teams (IMTs). The pocket cards will be posted on Craig Dispatch and National Wildfire

Coordinating Group (NWCG) pocket card web site (<http://fam.nwcg.gov/fam-web/pocketcards/default.htm>). Fire suppression supervisors will utilize pockets cards to train and brief suppression personnel.

Program Improvements

◆ Training

- Provide FDOP training to cooperators including county fire FMOs, cooperating dispatch centers, and fire departments.
- Train more personnel as first responders to RAWs malfunctions.
- Establish local WIMS/NFDRS training courses for agency personnel.
- Emphasize NFDRS training (S-491) at the geographic area level for mid-level fire management personnel.
- Inform agency fire suppression supervisors of FDOP applications by integrating the training in unit orientation meetings. At a minimum, this should include FMO's, Fire Operations Supervisors, Area Managers, and Fire Wardens.

◆ RAWs

- Find and input missing weather data into KCFast.
- Report errors of weather data to KCFast.

◆ Technology & Information Management

- Integrate preparedness and dispatch level flow charts into a web based package.
- Improve the CRC Internet Site where pertinent seasonal risk assessment information can be reviewed.

Drawdown Levels

At the various Preparedness Levels, the following resources will be held within the NWCFMU Area:

Preparedness Level 1 – BLM/FWS- One Engine
State/County - One Engine

Preparedness Level 2 – BLM/FWS- Two Engines or One
Engine/Squad
State/County - One Engine

Preparedness Level 3 – BLM/FWS- Three Engines or Two
Engines/Squad
State/County - One Engine

Preparedness Level 4 - All Resources excluding the twenty person
crew (Type II) and one Engine

Preparedness Level 5 - All Resources excluding the twenty person
crew (Type II)

NPS and USFS resources are not included in the drawdown levels

Appendix A - Team Members

Fire Danger Operating and Preparedness Plan

Colt Mortenson	Kevin Thompson
Fire Management Officer	East Zone Fuels FMO
Bureau of Land Management	Bureau of Land Management
NWCFMU	NWCFMU
Dave Toelle	Lynn Barclay
Assistant Fire Management Officer	Prevention and Mitigation Specialist
Bureau of Land Management	Bureau of Land Management
NWCFMU	NWCFMU
Stacy Gray	Garner Harris
Dispatch Center Manager	South Zone FMO
Craig Interagency Fire Center	Bureau of Land Management
	NWCFMU
Joe Flores	
Fire Management Officer	Kyle Frary
Dinosaur National Monument	South Zone Fuels (Detailed)
NWCFMU	Bureau of Land Management
	NWCFMU
Dale Beckerman	
North Zone Fire Mgt Specialist	
Bureau of Land Management	
Little Snake Field Office	
NWCFMU	
Tim Foley	
State of Colorado	
Pam Levitt	
GIS Specialist	
Bureau of Land Management	
Little Snake Field Office	
Marty Mortenson	
Java Script and HTML Specialist	
Consultant	

Appendix B - Primary Distribution List

Name	Title	Agency	Mailing Address	E-mail
Joes Flores	FMO	NPS	4545 E Hwy 40 Dinosaur, Co 81610	joseph_flores@nps.gov
Chris Dippel	Refuge Manger	FWS	1318 Hwy 318 Maybell, CO 81640	Cris_Dippel@fws.gov
Mary Risser	Superintendent	NPS	4545 E Hwy 40 Dinosaur, Co 81610	Mary_Risser@nps.gov
Dave Stout	Field Manger	BLM	2103 E. Park Avenue P.O. Box 68 Kremmling, Colorado 80459	dstout@blm.gov
Ann Timberman	Project Manager	FWS	953 Jackson County Road #32 Walden, Colorado 80480	Ann_Timberman@fws.gov
Tracy Swensen	FMO	FWS	2155 W. Forest St. Brigham City, UT 84302	Tracy_Swenson@fws.gov
Vern Bentley	FMO	FS	2468 Jackson St Laramie, WY 82070	vbentley@fs.fed.us
Mark Cahur	ZFMO	FS	925 Weiss Drive, Steamboat Springs, CO 80487	mcahur@fs.fed.us
Wendy Reynolds	Field Manger	BLM	455 Emerson St Craig, CO 81625	wreynolds@blm.gov
John Twitchell	District Forester	State	PO Box 773657 Steamboat Springs, CO 80477	John.twitchell@colostate.edu
Ron Cousineau	District Forester	State	PO Box 69 201 E. Jasper Ave. Granby, CO 80446- 0069	Ron.Cousineau@colostate.edu
Tim Foley	FMO	State	222 South 6th Street, Room 416 Grand Junction, CO 81501-2771	Tim.foley@colostate.edu
Ken Kerr	State FMO	BLM	2850 Youngfield St Lakewood, Co 80215	KrKerr@BLM.gov
Kent Walter	Field Manger	BLM	220 E. Market Street Meeker, CO 81641	k1walter@blm.gov
Dave Rosenkarance	Associate District Manger	BLM	2815 H Rd. Grand Junction, CO	drosenkrance@blm.gov
Todd Wheeler	FMO	Moffat Co	800 West 1 st , Ste. #100 Craig, CO 81625	twheeler@sheriff.moffat.co.us

The above list indicates key personnel associated with this plan. Copies of the FDOP will also be distributed to Colorado Division of Forestry and State Lands Mangers, MBR National Forest Personnel, Park Service Coordinators, Local fire departments, and surrounding County Cooperators.

Appendix C – Glossary

10-Hr Timelag Fuels	Dead fuels consisting of roundwood in the size range of 1/4 to 1 inch in diameter and, very roughly, the layer of litter extending from just below the surface to roughly 3/4 of an inch below the surface.*
100-Hr Timelag Fuels	Dead fuels consisting of roundwood in the size range of 1 to 3 inches in diameter and, very roughly, the forest floor from 3/4 of an inch to 4 inches below the surface.*
1000-Hr Timelag Fuels	Dead fuels consisting of roundwood 3 to 8 inches in diameter or the layer of the forest floor more than about 4 inches below the surface or both.*
Adjective Rating	A public information description of the relative severity of the current fire danger situation.
Annual Plant	A plant that lives for one growing season, starting from a seed each year.
Burning Index (BI)	BI is a number related to the contribution of fire behavior to the effort of containing a fire. The BI (difficulty of control) is derived from a combination of Spread Component (how fast it will spread) and Energy Release Component (how much energy will be produced). In this way, it is related to flame length, which, in the Fire Behavior Prediction System, is based on rate of spread and heat per unit area. However, because of differences in the calculations for BI and flame length, they are not the same. The BI is an index that rates fire danger related to potential flame length over a fire danger rating area. The fire behavior prediction system produces flame length predictions for a specific location (Andrews, 1986). The BI is expressed as a numeric value related to potential flame length in feet multiplied by 10. The scale is open-ended which allows the range of numbers to adequately define fire problems, even during low to moderate fire danger.
Climatological Breakpoints	Points on the cumulative distribution of one fire weather/fire danger index without regard to associated fire occurrence/business. They are sometimes referred to as exceedence thresholds.
Duff	The partially decomposed organic material of the forest floor that lies beneath the freshly fallen twigs, needles and leaves. (The F and H layers of the forest soil profile.)
Energy Release Component (ERC)	ERC is a number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. Since this number represents the potential “heat release” per unit area in the flaming zone, it can provide guidance to several important fire activities. It may also be considered a composite fuel moisture value as it reflects the contribution that all live and dead fuels have to potential fire intensity. The ERC is a cumulative or “build- up” type of index. As live fuels cure and dead fuels dry, the ERC values get higher thus providing a good reflection of drought conditions. The scale is open-ended or unlimited and, as with other NFDRS components, is relative. Conditions producing an ERC value of 24 represent a potential heat release twice that of conditions resulting in an ERC value of 12.

Equilibrium Moisture Content	The moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle has reached its equilibrium moisture content, the net exchange of moisture between it and its environment is zero.
Fire Business Thresholds	Values of one or more fire weather/fire danger indexes that have been statistically related to occurrence of fires (fire business). Generally, the threshold is a value or range of values where historical fire activity has significantly increased or decreased.
Fire Danger	The resultant descriptor of the combination of both constant and variable factors that affect the ignition, spread, and control difficulty of control of wildfires on an area.
Fire Danger Continuum	The range of possible values for a fire danger index or component, given a set of NFDRS parameters and weather input.
Fire Danger Rating	A system that integrates the effects of existing and expected states of selected fire danger factors into one or more qualitative or numeric indices that reflect an areas protection needs.
Fire Danger Rating Area	A geographic area relatively homogeneous in climate, fuels and topography, tens of thousands of acres in size, within which the fire danger can be assumed to be uniform. Its size and shape is primarily based on influences of fire danger, not political boundaries. It is the basic, on the ground unit for which unique fire danger decisions are made based on fire danger ratings. Weather is represented by one or more NFDRS weather (RAWS) stations.
Fire Weather Forecast Zone	A grouping of fire weather forecast stations that experience the same weather change or trend. Zones are developed by the National Weather Service to assist NWS production of fire weather forecasts or trends for similar stations. Fire weather forecast zones are best thought of as a list of similar weather stations, rather than an area on a map.
Forb	A non- grass-like herbaceous plant.
Fuel Class	A group of fuels possessing common characteristics. In the NFDRS, dead fuels are grouped according to their timelag (1, 10, 100, and 1000 hr) and live fuels are grouped by whether they are herbaceous (annual or perennial) or woody.
Fuel Model	A simulated fuel complex for which all fuel descriptions required by the mathematical fire spread model have been supplied.
Fuel Moisture Content	The water content of a fuel particle expressed as a percent of the oven-dry weight of the particle. Can be expressed for either live or dead fuels.
Fuels	Non-decomposed material, living or dead, derived from herbaceous plants.

Green-up	Green-up within the NFDRS model is defined as the beginning of a new cycle of plant growth. Green- up occurs once a year, except in desert areas where rainy periods can produce a flush of new growth more than once a year. Green- up may be signaled at different dates for different fuel models. Green-up should not be started when the first flush of green occurs in the area. Instead, the vegetation that will be the fire problem (represented by the NFDRS fuel model associated with the weather station) when it matures and cures should be identified. Green-up should start when the majority of this vegetation starts to grow.
Herb	A plant that does not develop woody, persistent tissue but is relatively soft or succulent and sprouts from the base (perennials) or develops from seed (annuals) each year. Included are grasses, forbs, and ferns.
Herbaceous Vegetation Moisture Content	The water content of a live herbaceous plant expressed as a percent of the oven-dry weight of the plant.
Ignition Component (IC)	IC is a rating of the probability that a firebrand will cause a fire requiring suppression action. Since it is expressed as a probability, it ranges on a scale of 0 to 100. An IC of 100 means that every firebrand will cause a fire requiring action if it contacts a receptive fuel.
Keetch-Byram Drought Index (KBDI)	KBDI is a stand-alone index that can be used to measure the effects of seasonal drought on fire potential. The actual numeric value of the index is an estimate of the amount of precipitation (in 100ths of inches) needed to bring the soil back to saturation (a value of 0 is complete saturation of the soil). Since the index only deals with the top 8 inches of the soil profile, the maximum KBDI value is 800 or 8.00 inches of precipitation would be needed to bring the soil back to saturation. The Keetch-Byram Drought Index's relationship to fire danger is that as the index value increases, the vegetation is subjected to increased stress due to moisture deficiency. At higher values, desiccation occurs and live plant material is added to the dead fuel loading on the site. Also, an increasing portion of the duff/litter layer becomes available fuel at higher index values.
Litter	The top layer of the forest floor, typically composed of loose debris such as branches, twigs, and recently fallen leaves or needles; little altered in structure by decomposition. (The layer of the forest soil profile.)
Live Fuels	Naturally occurring fuels whose moisture content is controlled by the physiological processes within the plant. The National Fire Danger Rating System considers only herbaceous plants and woody material small enough (leaves, needles and twigs) to be consumed in the flaming front of a fire.
Mitigation and Education Specialist	Oversees fire prevention, education, mitigation, public information, and the investigation and recovery of the cost of human-caused fires.
Moisture of Extinction	The theoretical dead fuel moisture content above which a fire will not spread.
Perennial Plant	A plant that lives for more than two growing seasons. For fire danger rating purposes, biennial plants are classed with perennials.

Roundwood	Boles, stems, or limbs of woody material; that portion of the dead wildland fuel which is roughly cylindrical in shape.
Shrub	A woody perennial plant differing from a perennial herb by its persistent and woody stem; and from a tree by its low stature and habit of branching from the base.
Slash	Branches, bark, tops, cull logs, uprooted stumps, and broken or uprooted trees left on the ground after logging; also debris resulting from thinning or wind storms.
Slope	The rise or fall in terrain measured in feet per 100 feet of horizontal distance measurement, expressed as a percentage.
Spread Component (SC)	SC is a rating of the forward rate of spread of a head fire. Deeming, et al. (1977), states that “the spread component is numerically equal to the theoretical ideal rate of spread expressed in feet-per-minute.” This carefully worded statement indicates both guidelines (it’s theoretical) and cautions (its ideal) that must be used when applying the Spread Component. Wind speed, slope and fine fuel moisture are key inputs in the calculation of the spread component, thus accounting for a high variability from day-to-day. The Spread Component is expressed on an open-ended scale; thus it has no upper limit.
Staffing Level	The basis for decision support for daily staffing of initial attack resources and other activities; a level of readiness and an indicator of daily preparedness.
Surface-Area-to-Volume Ratio	The ratio of the surface area of a fuel particle (in square- ft) to its volume (in cubic-ft). The “finer” the fuel particle, the higher the ratio; for example, for grass this ratio ranges above 2,000; while for a ½ inch diameter stick it is 109.
Timelag	The time necessary for a fuel particle to lose approximately 63% of the difference between its initial moisture content and its equilibrium moisture content.
Timelag Fuel Moisture Content	The dead fuel moisture content corresponding to the various timelag fuel classes.
X-1000 Hr Fuel Moisture	X-1000 is the live fuel moisture recovery value derived from the 1000-hr fuel moisture value. It is an independent variable used in the calculation of the herbaceous fuel moisture. The X-1000 is a function of the daily change in the 1000-hour timelag fuel moisture, and the average temperature. Its purpose is to better relate the response of the live herbaceous fuel moisture model to the 1000-hour timelag fuel moisture value. The X-1000 value is designed to decrease at the same rate as the 1000-hour timelag fuel moisture, but to have a slower rate of increase than the 1000-hour timelag fuel moisture during periods of precipitation, hence limiting excessive herbaceous fuel moisture recovery.

Appendix D – WIMS User ID's

Name	WIMS User ID
Jenna Beckerman	BLM1811
Colt Mortenson	BLM2112
Janell Neubauer	BLM2409
Taylor Welshimer	BLM175
Dale Beckerman	BLM2475
Dave Toelle	BLM1417
Tim Foley	BLM1684
Joe Flores	NPS1403
Mark Cahur	FS6741
Mick Hood	FS11577
Daron Reynolds	FS7113
Dezarae Stahlin	BLM2452
Wendy Finnegan	BLM1737
Vern Bentley	FS11535
Tracy Swenson	FS7002
Garner Harris	BLM142
James Michels	BLM1922

For assistance with passwords you may contact the WIMS help desk at 1-866-224-7677 or 360-326-6002, email: firedesk@dms.nwcg.gov.

Appendix E – Fire Family Plus Working Sets

North Zone Working Set

NFDRS 2012 v 1.2 - Working Set

Database Name: C:\Users\Col\Desktop\NFDRS\NFDRS 2012 v 1.2

Description: NFDRS NWCFMU 2012

Active Working Set Definition

SIG/Station: SIG - COZ200

Data Years (1978 - 2010): 1995 thru 2010

Enable Auxiliary Year Overlays

Analysis Period Length (Days): 1

Annual Filter (Time of Year)

Month: May Day: 15

Month: October Day: 15

Fire Associations

Fire Analysis Options

Fire Cause

Lightning

Human

All

Fire Definitions

Large Fire (Acres): 100

Multi Fire Day (Fires): 3

Analysis Type

Cumulative Analysis

Probability Analysis

Both

Analysis Variable

Energy Release Component

Conditional Probability Analysis- FireDays Only

OK

Cancel

Select Fires for Summary for SIG - COZ200

USFS | BIA | BLM | NPS | FWS | NWCFMU_FDRA

Region(s)

East East Zone

North North Zone

South South Zone

Unit(s)

1 USFS

3 BLM

4 NPS

5 FWS

Sub Unit(s)

View Selections

View Fires

OK

Cancel

Apply

SIG/Station Metadata:

StationID	Name	NFDRS Fuel Model	Use 88 Mode	Slope Class	Climate Class	Greenup DOY	Freeze DOY	Start KBDI	Start FM 1000	Avg Precip	FM1 = FM10	Herb Annual	Deciduous	Aspect	Slope Position	Elevation	Latitude
050104	LADORE	G - Short-Needle (Heavy Dead)		1	2	05/14	12/31	100	20.00	9.00				5	L	5,940	41
050105	DINOSAUR NM SI	G - Short-Needle (Heavy Dead)		1	1	05/14	12/31	100	15.00	11.64				0	L	5,960	41
050106	GREAT DIVIDE	G - Short-Needle (Heavy Dead)		1	2	05/14	12/31	100	20.00	13.00				0	U	7,220	41
050108	CALICO	G - Short-Needle (Heavy Dead)		1	2	05/14	10/15	0	20.00	10.00				0	U	6,720	40

East Zone Working Set

NFDRS 2012 v 1.2 - Working Set

Database Name: C:\Users\Col\Desktop\NFDRS\NFDRS 2012 v 1.2

Description: NFDRS NWCFMU 2012

Active Working Set Definition

SIG/Station: SIG - COZ201

Data Years (1964 - 2010): 1995 thru 2010

Enable Auxiliary Year Overlays

Analysis Period Length (Days): 1

Fire Associations

Fire Analysis Options

Fire Cause

Lightning

Human

All

Fire Definitions

Large Fire (Acres): 100

Multi Fire Day (Fires): 5

Analysis Type

Cumulative Analysis

Probability Analysis

Both

Analysis Variable

Energy Release Component

Conditional Probability Analysis- FireDays Only

OK

Cancel

Set Fire Associations for SIG - COZ201

USFS | BIA | BLM | NPS | FWS | NWCFMU_FDRA

Region(s)

East East Zone

North North Zone

South South Zone

Unit(s)

1 USFS

3 BLM

4 NPS

5 FWS

Sub Unit(s)

View Selections

View Fires

OK

Cancel

Apply

SIG/Station Metadata:

StationID	Name	NFDRS Fuel Model	Use 88 Mode	Slope Class	Climate Class	Greenup DOY	Freeze DOY	Start KBDI	Start FM 1000	Avg Precip	FM1 = FM10	Herb Annual	Deciduous	Aspect	Slope Position	Elevation	Latitude
050207	DRY LAKE	G - Short-Needle (Heavy Dead)		2	3	06/07	12/31	100	25.00	22.00				5	M	8,280	41
050304	WILLOW CREEK	G - Short-Needle (Heavy Dead)		2	3	06/07	12/31	100	25.00	20.00				2	M	9,680	40
050404	GUNSIGHT	G - Short-Needle (Heavy Dead)		2	2	05/14	12/31	100	20.00	14.00				4	U	8,360	40
050406	PORCUPINE	G - Short-Needle (Heavy Dead)		2	3	06/07	12/31	100	25.00	20.00				3	M	8,880	40
050407	DRY GULCH	G - Short-Needle (Heavy Dead)		2	2	05/14	10/15	0	20.00	18.00				4	M	7,200	40
051404	DEADHORSE	G - Short-Needle (Heavy Dead)		2	3	05/26	12/31	100	25.00	28.00				3	U	8,960	40
051608	HANGMAN	G - Short-Needle (Heavy Dead)		1	2	05/07	12/31	0	20.00	20.00				4	U	7,834	40
050305	INDEPENDENCE	G - Short-Needle (Heavy Dead)		1	2	05/04	10/15	0	20.00	13.00				3	M	8,993	41

South Zone Working Set

NFDRS 2012 v 1.2 - Working Set

Database Name: C:\Users\Col\Desktop\NFDRS\NFDRS 2012 v 1.2

Description: NFDRS NWCFMU 2012

Active Working Set Definition

SIG/Station: SIG - COZ202

Data Years (1972 - 2010): 1995 thru 2010

☐ Enable Auxiliary Year Overlays

Analysis Period Length (Days): 1

Annual Filter (Time of Year)

Month: May Day: 15

Month: October Day: 15

Fire Associations

Fire Analysis Options

Fire Cause

☐ Lightning

☐ Human

☒ All

Fire Definitions

Large Fire (Acres): 100

Multi Fire Day (Fires): 5

Analysis Type

☐ Cumulative Analysis

☒ Probability Analysis

☐ Both

Analysis Variable

Energy Release Component

☐ Conditional Probability Analysis- FireDays Only

OK Cancel

Set Fire Associations for SIG - COZ202

USFS | BIA | BLM | NPS | FWS | NWCFMU_FDRA

Region(s) Unit(s) Sub Unit(s)

East East Zone 1 USFS

North North Zone 3 BLM

South South Zone 4 NPS

5 FWS

View Selections View Fires OK Cancel Apply

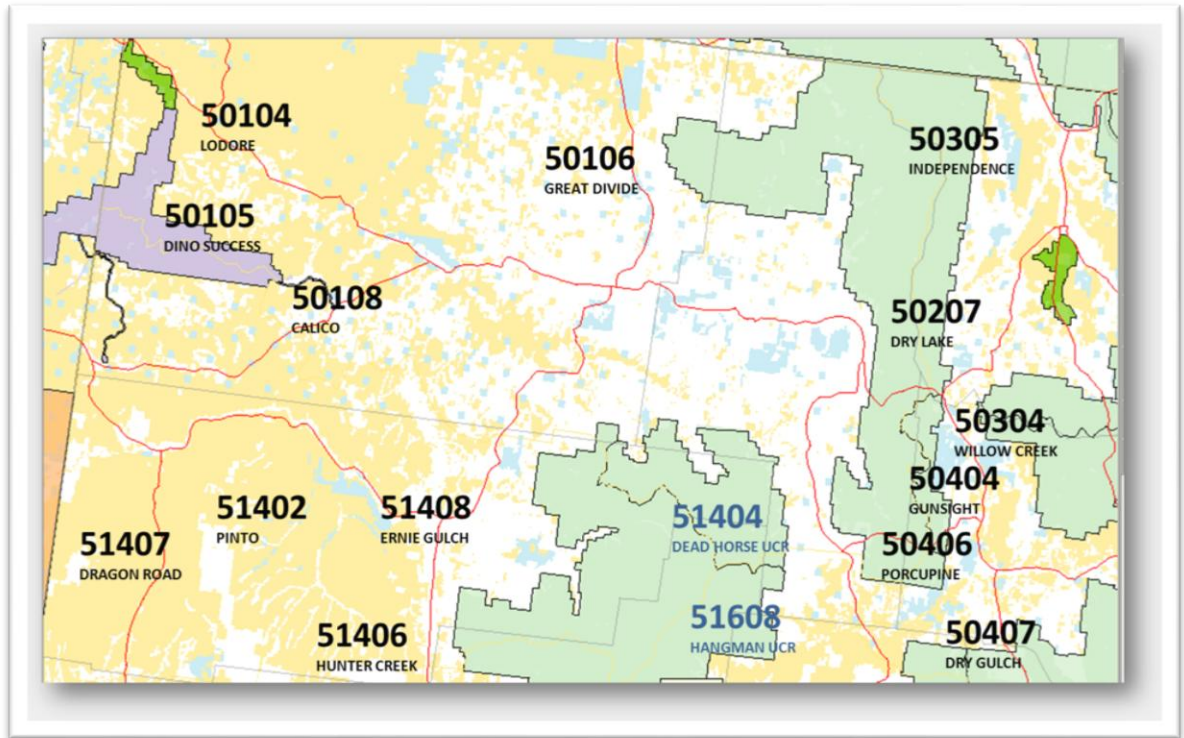
SIG/Station Metadata:

StationID	Name	NFDRS Fuel Model	Use 88 Mode	Slope Class	Climate Class	Greenup DOY	Freeze DOY	Start KBDI	Start FM 1000	Avg Precip	FM1 = FM10	Herb Annual	Deciduous	Aspect	Slope Position	Elevation	Latitude
051402	PINTO	G - Short-Needle (Heavy Dead)	<input type="checkbox"/>	2	2	05/14	12/31	100	20.00	10.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	U	6,660	40
051406	HUNTER CREEK	G - Short-Needle (Heavy Dead)	<input type="checkbox"/>	3	2	05/14	12/31	100	20.00	14.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	M	6,920	40
051407	DRAGON ROAD	G - Short-Needle (Heavy Dead)	<input type="checkbox"/>	2	2	05/14	12/31	100	20.00	8.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	U	6,240	40
051408	ERNIE GULCH	G - Short-Needle (Heavy Dead)	<input type="checkbox"/>	3	2	05/14	12/31	100	20.00	12.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	U	7,000	40

Appendix F – Weather Station Data Analysis

Weather Station Analysis from 1995-2010						
Station ID	RAWS Station Name	Agency Owner	Fire Danger Zone	Date	Solution	Comments
50104	Ladore	BLM CRD	COZ200	5/27/1978	delete	No Min/Max RH or Temp
50105	Ladore	BLM CRD	COZ200	5/30/1978	delete	No Min/Max RH or Temp
50106	Ladore	BLM CRD	COZ200	6/22/1978	delete	No Min/Max RH or Temp
50107	Ladore	BLM CRD	COZ200	7/24/1978	delete	No Min/Max RH or Temp
50106	Great Divide	BLM CRD	COZ200	8/21/1996	delete	No Max Temp
50106	Great Divide	BLM CRD	COZ200	9/16/1993	delete	No Min/Max RH
50108	Calico	BLM CRD	COZ200	6/1/2009	delete	2.99 inches of rain in one hour
50305	Independence	BLM CRD	COZ201			Looks OK
50404	Gunsight	BLM CRD	COZ201	4/24/2000	delete	1300 temp 118
50404	Gunsight	BLM CRD	COZ201	07/30/00 thru 06/05/01	delete	Poor Min/Max RH
50404	Gunsight	BLM CRD	COZ201	4/03/00 thru 04/28/00	delete	Poor Min/Max RH
50404	Gunsight	BLM CRD	COZ201	06/24/05 thru 06/30/05	delete	Poor Min/Max RH 2% for both
50404	Gunsight	BLM CRD	COZ201	4/25/2000	delete	1300 temp 112
50407	Dry Gulch	BLM CRD	COZ201			Looks OK
51402	Pinto	BLM CRD	COZ202	8/13/2000	delete	No Min Temp
51406	Hunter Creek	BLM CRD	COZ202			Looks OK
51407	Dragon Road	BLM CRD	COZ202	4/15/1999	delete	Min Temp -32
51408	Ernie Gulch	BLM CRD	COZ202			Looks OK
50105	Dino Success	NPS	COZ200			Missing Weather in Winter Months
50207	Dry Lake	FS	COZ201			Looks OK
50304	Willow Creek	FS	COZ201			Looks OK
50406	Porcupine	FS	COZ201			Looks OK
51404	Dead Horse	FS WRF	COZ201	06/25,26,27,28/03	delete	Max RH didn't change 10%
51404	Dead Horse	FS WRF	COZ201	7/3/1999	delete	Min/Max Rx is 1% for both
51404	Dead Horse	FS WRF	COZ201	9/26/1999	delete	no min temp
51404	Dead Horse	FS WRF	COZ201	6/19/2008	delete	Max RH of 67% but .35" rain in 7 hours
51404	Dead Horse	FS WRF	COZ201	6/18/2008	delete	3.36 inches of rain in one hour
51608	Hangman	BLM UCR	COZ201	9/28/2006	delete	Min temp -32

RAWS Locations (Map)



Appendix G – Preparedness Level Actions

The following Preparedness Level actions are guidelines for agency personnel. They are discretionary in nature and usually will require a consensus between agency personnel prior to implementation.

1. Agency Administrator

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
Agency Administrator	Ensure the office staff is notifying CRC of their fire availability.	√	√	√	√	√	Agency
	Ensure resource advisors are designated and available for fire assignments.	√	√	√	√	√	Agency
	Evaluate work/rest needs of fire staff and crews.	√	√	√	√	√	Agency
	Consider need for fire restriction or closures. See Fire Restriction Plan for guidance.				√	√	Public Industry
	Provide appropriate political support to fire staffs regarding the implementation of preparedness level actions.			√	√	√	Agency Public Industry
	Review and transmit severity requests submitted by the FMO to the appropriate level.				√	√	Agency
	Issue guidance to staff indicating severity of the season and increased need and availability for fire support personnel.				√	√	Agency

2. Fire Management Officer

Responsible Party		Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
FMO	1	If preparedness level is decreasing, consult with FCO/Duty Officer/ Center Manager and consider release of pre-positioned or detailed personnel.	√	√	√	√	√	Agency
	2	Evaluate season severity data (BI and ERC trends for season, fuel loadings, live FM, drought indices, and long term forecasts).	√	√	√	√	√	Agency
	3	Evaluate crew and staff work/rest requirements.	√	√	√	√	√	Agency
	4	Brief agency administrator on burning conditions and fire activity.			√	√	√	Agency
	5	Review geographical and national preparedness levels and evaluate need to suspend local prescribe fire activities.			√	√	√	Agency
	6	Ensure Prevention Officer/MES has initiated media contacts and public education contacts.			√	√	√	Public Industry
	7	Ensure agency staff is briefed on increasing fire activity.			√	√	√	Agency
	8	Brief State/Regional FMO on increasing fire activity.				√	√	Agency
	9	Consider fire severity request and pre-positioning of resources including: suppression resources, aerial support, aerial supervision, command positions, dispatch, logistical support, and prevention.				√	√	Agency Public Industry
	10	Evaluate need for fire restrictions or closures with interagency partners.			√	√	√	Public Industry
	11	Evaluate season Severity data (BI and ERC trends for season, fuel loadings, live FM, Drought indices and long term forecasts	√	√	√	√	√	Agency

Responsible Party		Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
	12	Request the Agency Administrator to issue guidance to office staff regarding the need for increased fire availability in support positions.				√	√	Agency
	13	Consult with the State FMO and agency administrator regarding potential need to pre-position a Type 3 or Type 2 Team.				√	√	Agency

3. Duty Officer

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
Duty Officer	Confirm (or Adjust) the Preparedness and Dispatch Levels with the CRC Manager.	√	√	√	√	√	Agency
	If preparedness level is decreasing, consider releasing pre-positioned and detailed resources.			√	√	√	Agency
	Ensure incoming pre-position or detailed personnel are briefed on local conditions.	√	√	√	√		Agency
	Evaluate work/rest needs of IA crews.		√	√	√	√	Agency
	Consider aerial detection flight.		√	√	√	√	Agency
	Evaluate need to change or shift duty hours of IA resources.		√	√	√	√	Agency
	Consider suspending prescribed fire operations.				√	√	Agency
	Consider extending staffing beyond normal shift length.			√	√	√	Agency
	Brief FMO on severity of conditions and consider severity requests.				√	√	Agency
	Consider pre-positioning and/or detailing of additional IA resources from off-unit.				√	√	Agency
	Consider pre-positioning and automatic dispatch of ATGS aircraft.				√	√	Agency
	Consider bringing in local IA resources from scheduled days off.			√	√	√	Agency
	Consider patrols and pre-positioning of local IA resources in high risk areas.		√	√	√	√	Agency
	Consider patrols in camping and recreation areas.				√	√	Public
	Consider suspension of project work away from station or where response time will be delayed				√	√	Agency
	Consider automatic dispatch of, helicopter, SEAT and/or heavy air tankers for IA.					√	Agency
	Conduct daily morning briefing	√	√	√	√	√	Agency

4. Resource Advisor

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
	Coordinate efforts with the Duty Officer and Incident Commanders.			√	√	√	Agency

5. Engine/Crew Leaders

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
Engine Module Leaders/ Crew Leaders	Ensure IA crews are briefed on local preparedness level, burning conditions, and availability of IA resources and air support.	√	√	√	√	√	Agency
	Evaluate work/rest needs of crew. Ensure days off are taken and request relief if needed.	√	√	√	√	√	Agency
	Ensure that an adequate daily briefing is provided.	√	√	√	√	√	Agency
	Ensure equipment and crew preparedness.	√	√	√	√	√	Agency
	Provide Duty Officer/ZFMO/FMO feedback regarding crew fatigue.	√	√	√	√	√	Agency
	Participate in prevention activities as required.	√	√	√	√	√	Public Industry
	Perform required check-ins - including checking-in when moving locations during the day.	√	√	√	√	√	Agency
	Provide duty officer with feedback regarding unique/unexpected fire behavior, severity conditions, and the need to increase IA capabilities.	√	√	√	√	√	Agency

6. ZFMO's

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
ZFMO	Ensure that roadside fire danger signs reflect the current adjective fire danger rating.	√	√	√	√	√	Public
	Ensure IA crews are briefed on local preparedness level, burning conditions, and availability of IA resources and air support.	√	√	√	√	√	Agency
	Ensure incoming pre-position or detailed personnel are briefed on local conditions.	√	√	√	√	√	Agency
	Evaluate work/rest needs of crews.			√	√	√	Agency
	Increase patrols in camping and recreation areas.				√	√	Public
	Consider suspension of project work away from station.					√	Agency
	Provide duty officer with feedback regarding unique/unexpected fire behavior and severity conditions and the need to increase IA capabilities.				√	√	Agency
	Consider suspension of project work away from station. (PL5)Assign project work within 5 minute response time to engine/vehicle. (PL4)Assign project work within 15 minute response time to engine/vehicle. (PL3/PL2)		√	√	√	√	Agency

7. Center Manger

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
Center Manager	Determine and broadcast the morning and afternoon preparedness, dispatch, and adjective fire danger levels to interagency fire personnel.	√	√	√	√	√	Agency
	Evaluate work/rest needs of center staff.			√	√	√	Agency
	If preparedness level is decreasing, consider release of pre-positioned or detailed dispatchers and logistical support personnel.		√	√	√	√	Agency
	Consult with Duty Officer concerning potential for extended staffing beyond normal shift length.				√	√	Agency
	Consider pre-positioning or detail of off-unit IA dispatchers and logistical support personnel.				√	√	Agency

	Consider discussing activation of local area MAC Group.					√	Agency
	Consult with duty officer and FMO regarding potential need for severity request.				√	√	Agency
	Consider bringing additional dispatch personnel in from scheduled days off.				√	√	Agency
	Begin tracking weekly availability of overhead personnel.		√	√	√	√	Agency
	Establish weekly conference calls with FMOs and Operations staff.		√	√	√	√	Agency
	Input weather observations into WIMS.	√	√	√	√	√	Agency

8. Fire Prevention Officer

Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
Fire Prevention Officer	Ensure that roadside fire danger signs reflect the current adjective fire danger rating.	√	√	√	√	√	Public
	Contact local media to make the public aware of the start of fire season and the potential for local fire danger to increase.	√	√	√	√	√	Public Industry
	Provide public and industrial entities with access to fire danger information, closures, restrictions, and warnings.	√	√	√	√	√	Public
	Ensure the public and industrial entities are aware of the policy of fire investigation and potential consequences related with the cost recovery process.	√	√	√	√	√	Public Industry
	Consider need for increased prevention patrols.				√	√	Agency
	Contact local industrial entities to make them aware of fire hazard and risk.				√	√	Industry
	Contact local fire chiefs to make them aware of fire danger.	√	√	√	√	√	Agency
	Consider door-to-door contacts in rural communities or ranch areas.				√	√	Public Industry
	Post signs and warnings in camp and recreation areas.				√	√	Public

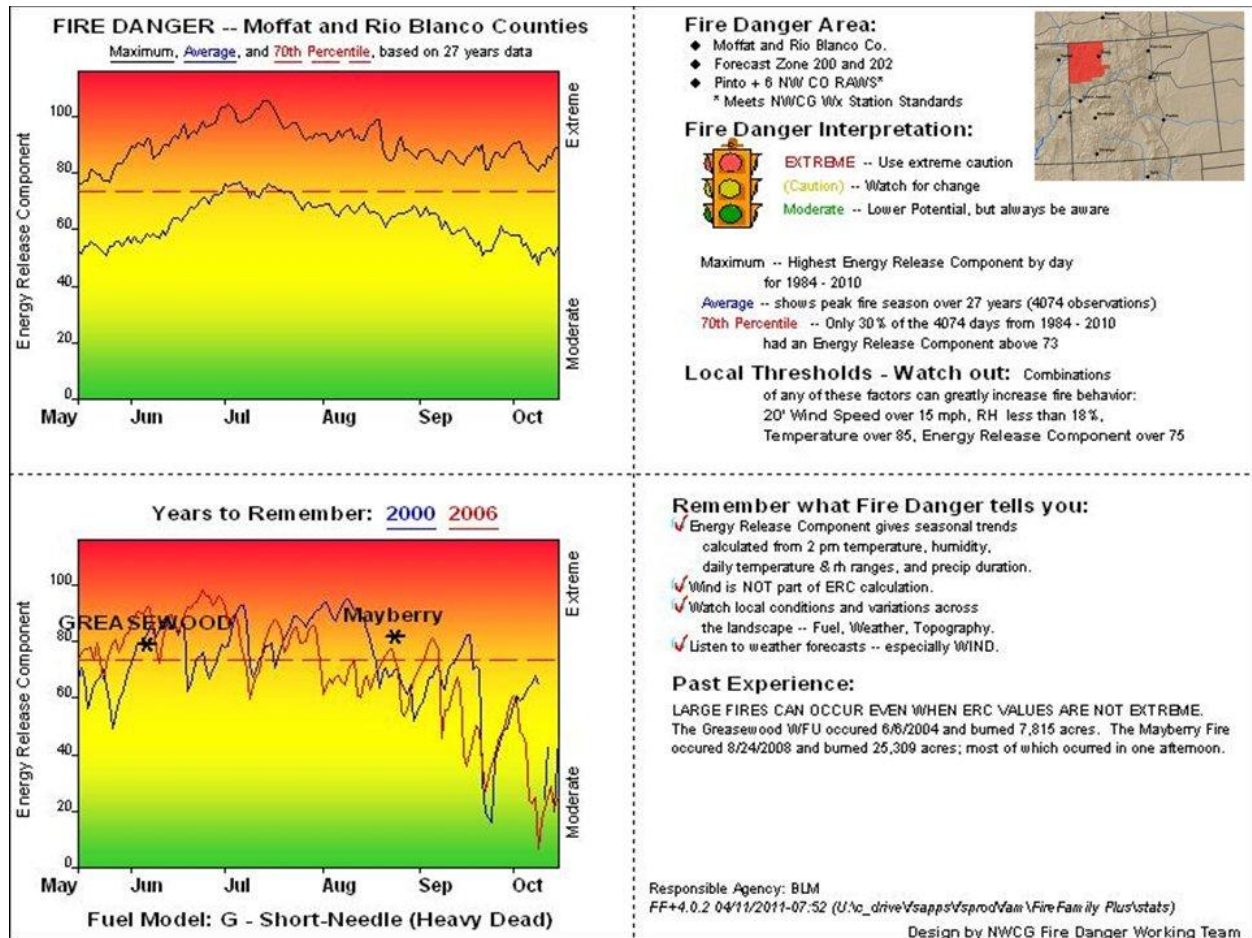
	Notify local media of high/extreme fire danger and of the need for increased public caution.				√	√	Public Industry
	Consult with AFMO's and FMO's regarding severity requests and the potential need for additional prevention personnel or fire prevention team.				√	√	Agency
	Consult with FMO regarding need for fire restrictions or closures.			√	√	√	Agency Public Industry

9. Law Enforcement Rangers

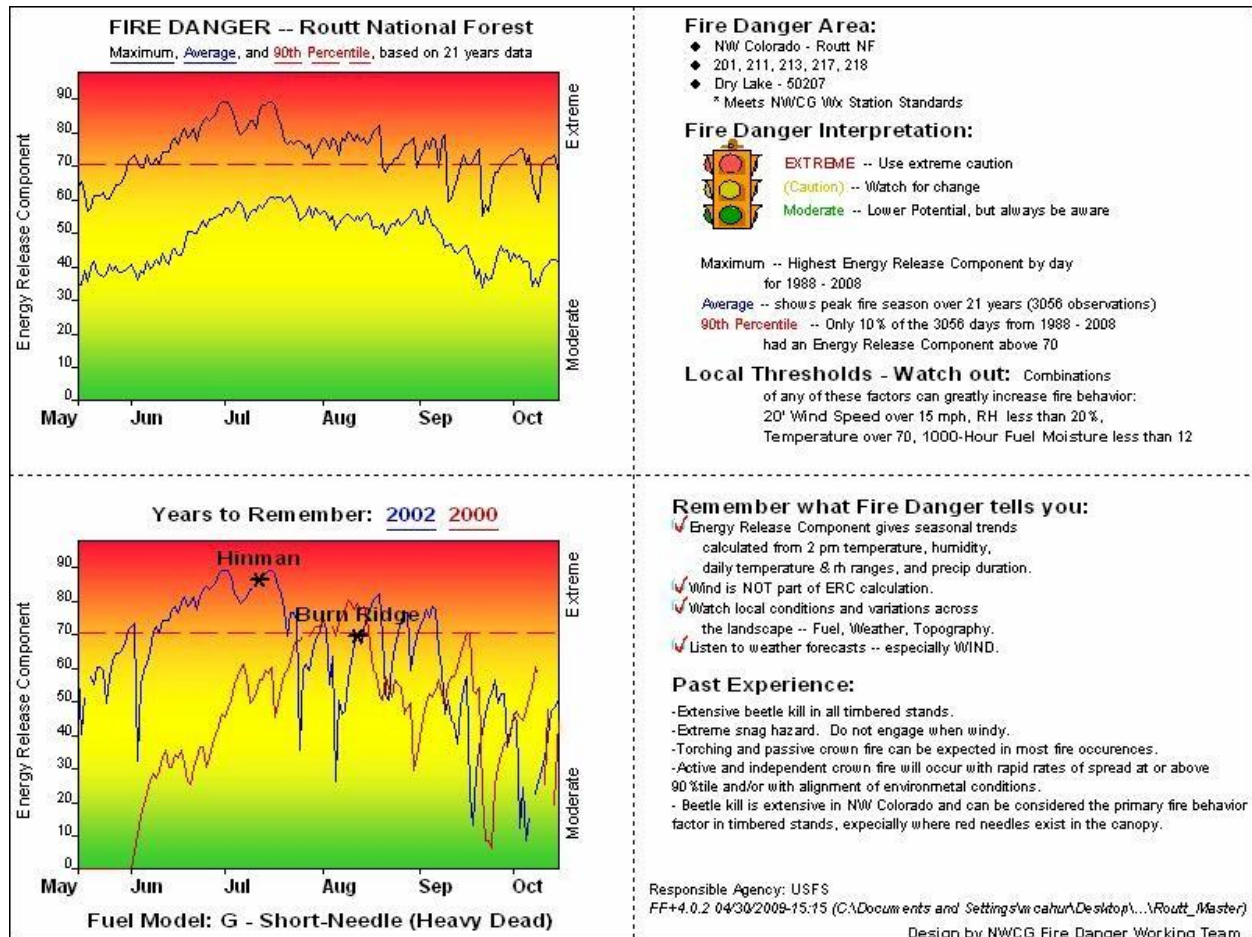
Responsible Party	Suggested Action	PL 1	PL 2	PL 3	PL 4	PL 5	Affected Entity
Law Rangers	Check-in and notify dispatch of daily availability for fire assignments and location for day.	√	√	√	√	√	Agency
	Consider increased patrol in high fire danger areas, such as campgrounds, OHV areas, shooting areas.				√	√	Public
	Consider pre-positioning of or detailing in fire investigation personnel.				√	√	Agency
	Consult with Fire Prevention Officer and FMO regarding need for fire restrictions or closures.					√	Public Industry

Appendix H – Pocket Cards

North and South Zone FDRA



Routt National Forest (East Zone FDRA)

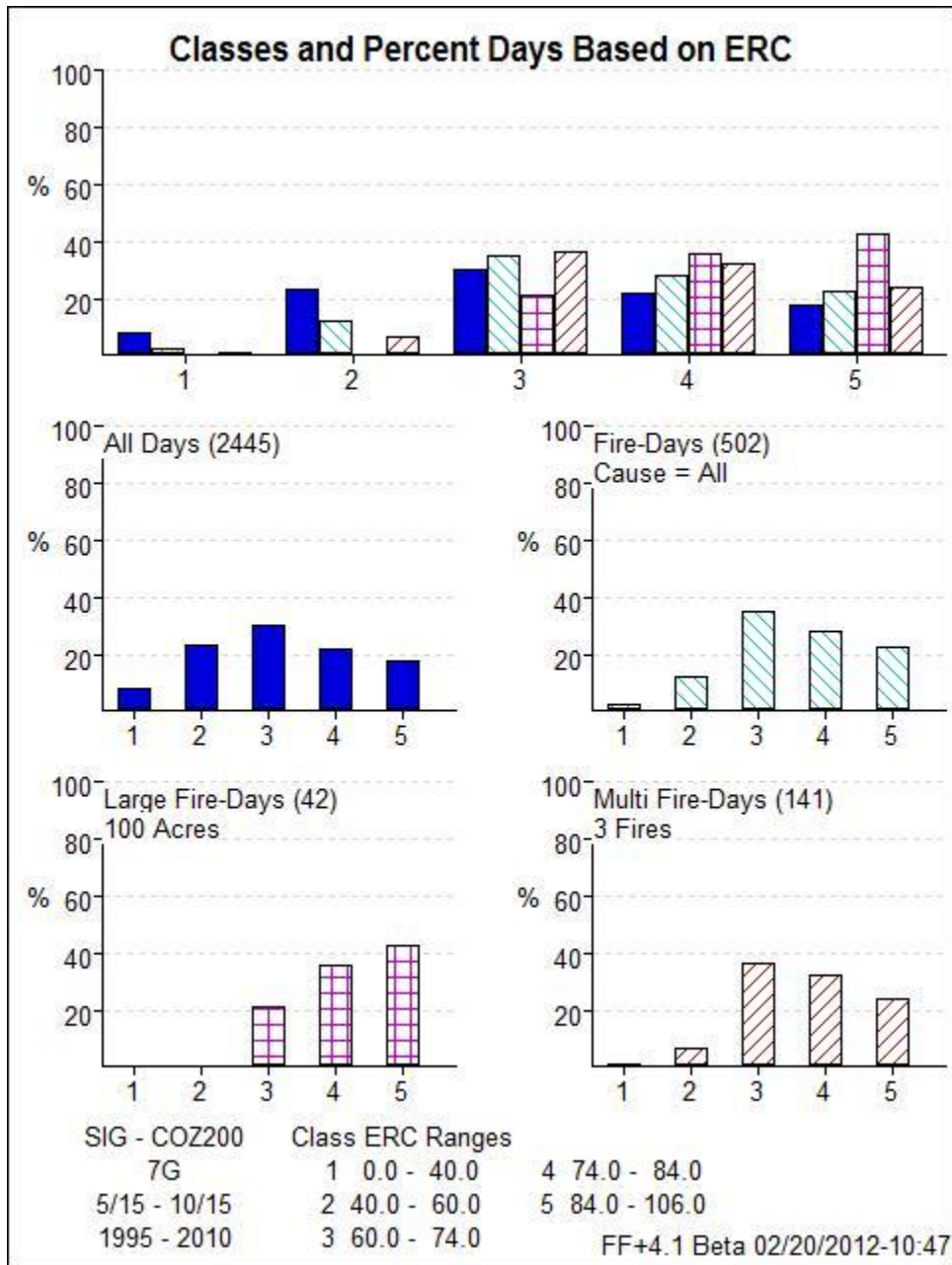


Appendix I--Weather Station Catalogs (BLM Only)

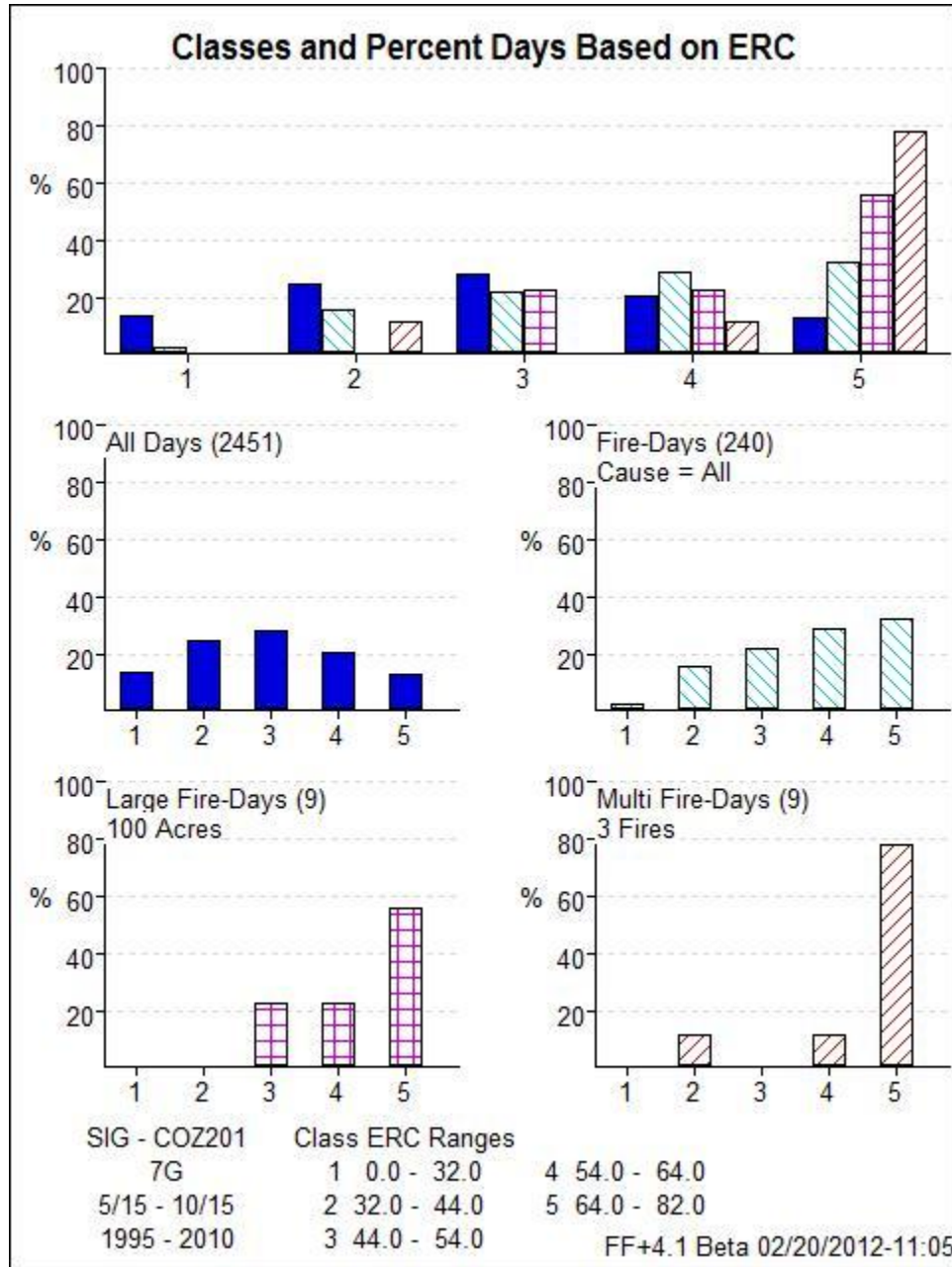
Station ID	Station Name	Priority	Model	Staffing Index	Decision Classes	Staffing Index Breakpoints			
						Low		High	
						SI%	VAL	SI%	VAL
50104	Ladore	1	7G	ERC	5	90	93	97	99
		2	7U	ERC	5	90		97	
50106	Great Divide	1	7G	ERC	5	90	83	97	90
		2	7U	ERC	5	90		97	
50108	Calico	1	7G	ERC	5	90	84	97	89
		2	7U	ERC	5	90		97	
50305	Independence	1	7G	ERC	5	90	65	97	75
		2	7U	ERC	5	90		97	
50404	Gunsight	1	7G	ERC	5	90	72	97	80
		2	7U	ERC	5	90		97	
50407	Dry Gulch	1	7G	ERC	5	90	75	97	79
		2	7U	ERC	5	90		97	
51402	Pinto	1	7G	ERC	5	90	87	97	93
		2	7U	ERC	5	90		97	
51406	Hunter Creek	1	7G	ERC	5	90	86	97	95
		2	7U	ERC	5	90		97	
51407	Dragon Road	1	7G	ERC	5	90	93	97	100
		2	7U	ERC	5	90		97	
51408	Ernie Gulch	1	7G	ERC	5	90	87	97	95
		2	7U	ERC	5	90		97	

Appendix J—Fire Family Plus Decision Points

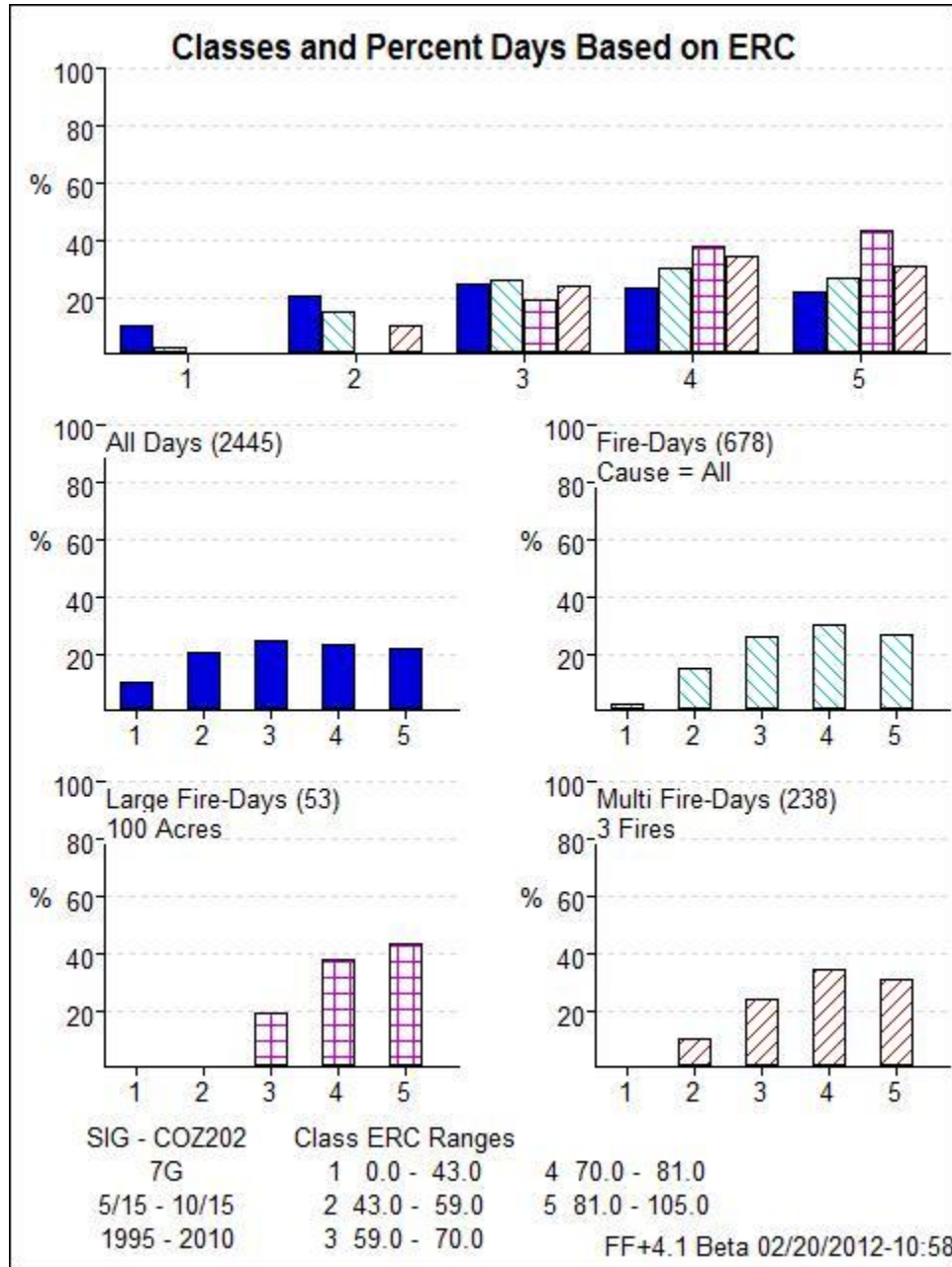
Preparedness Level Decision Points (North Zone)



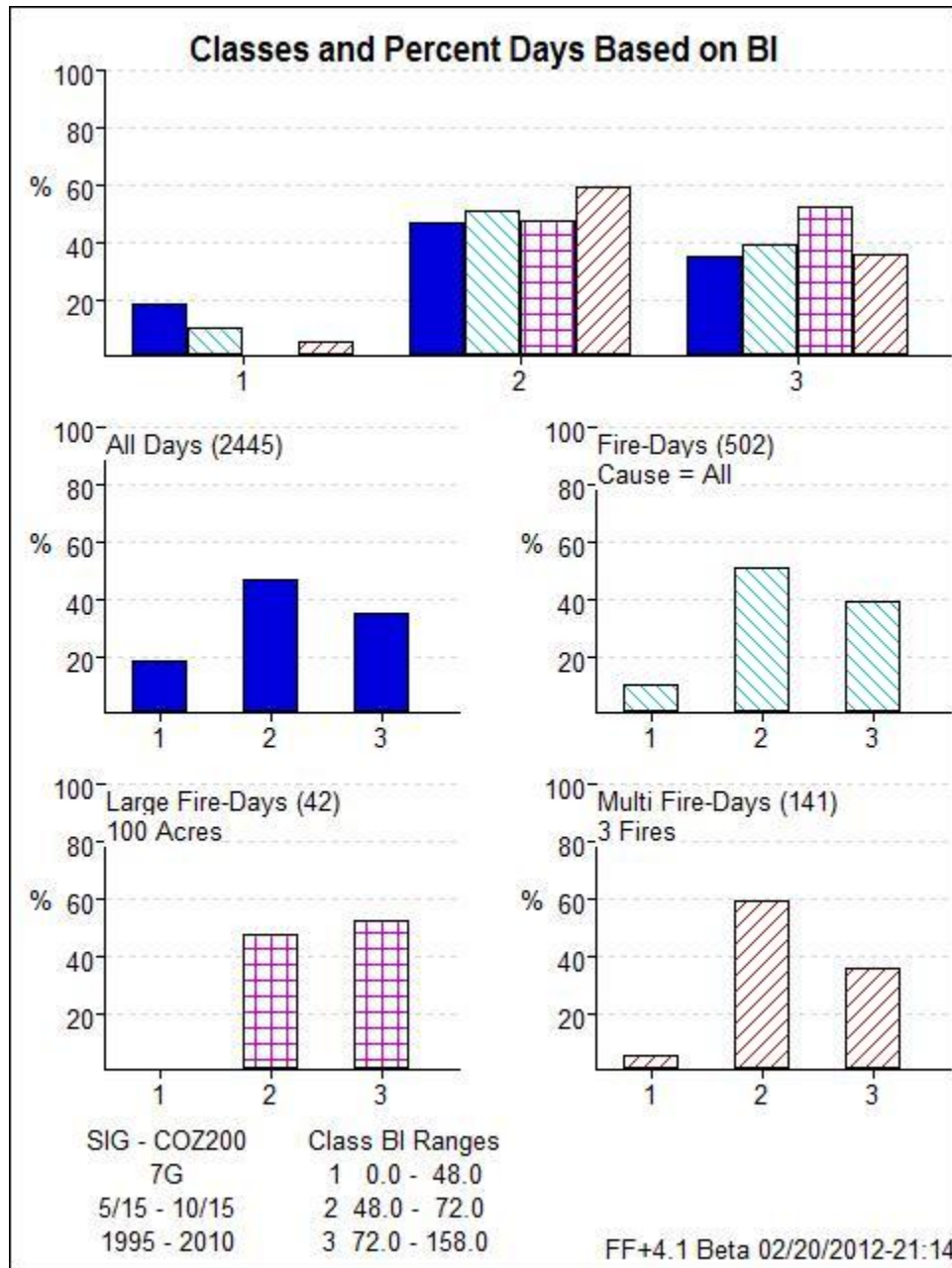
Preparedness Level Decision Points (East Zone FDRA)



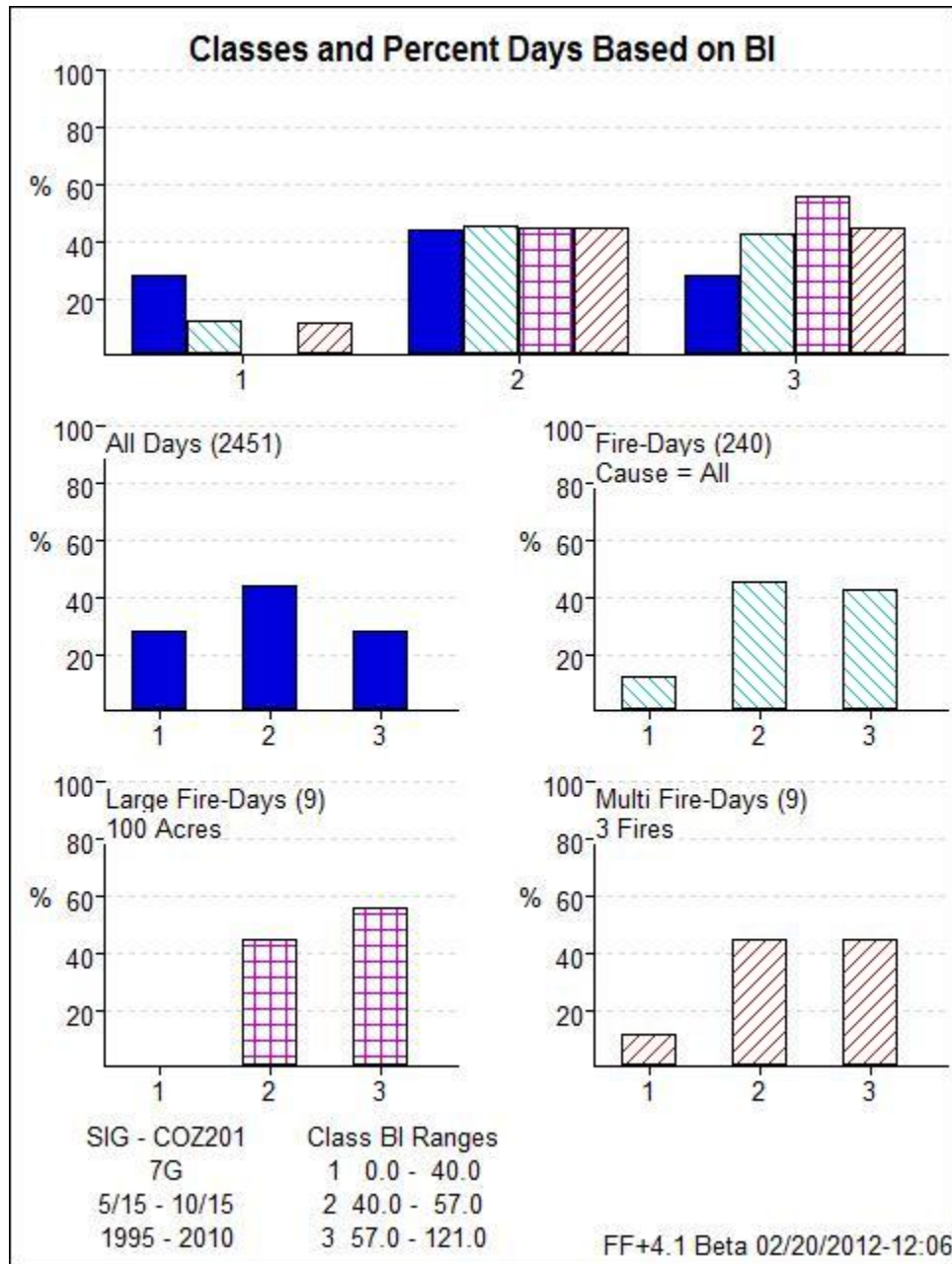
Preparedness Level Decision Points (South Zone FDRA)



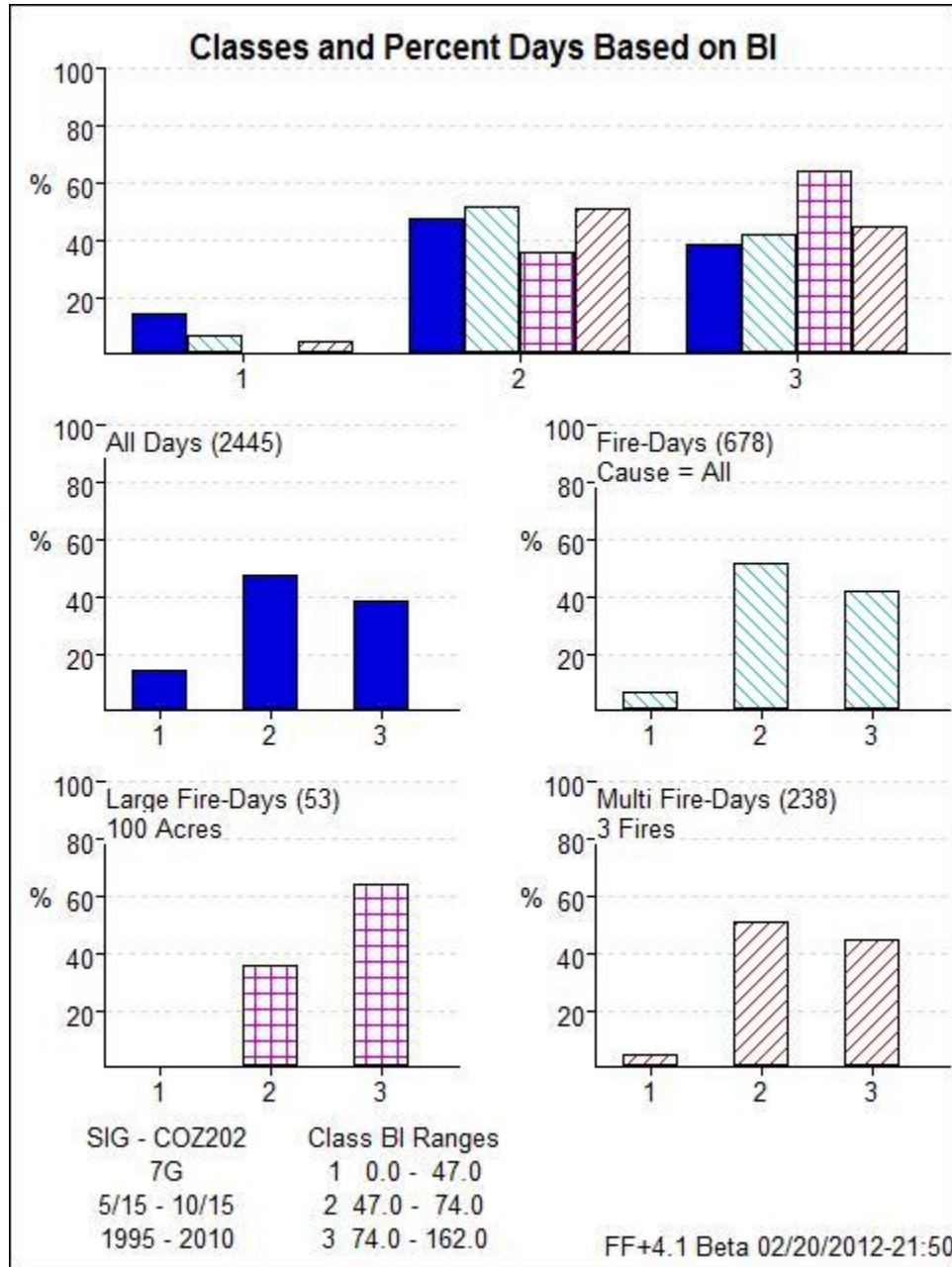
Dispatch Level Decision Points (North Zone FDRA)



Dispatch Level Decision Points (East Zone FDRA)



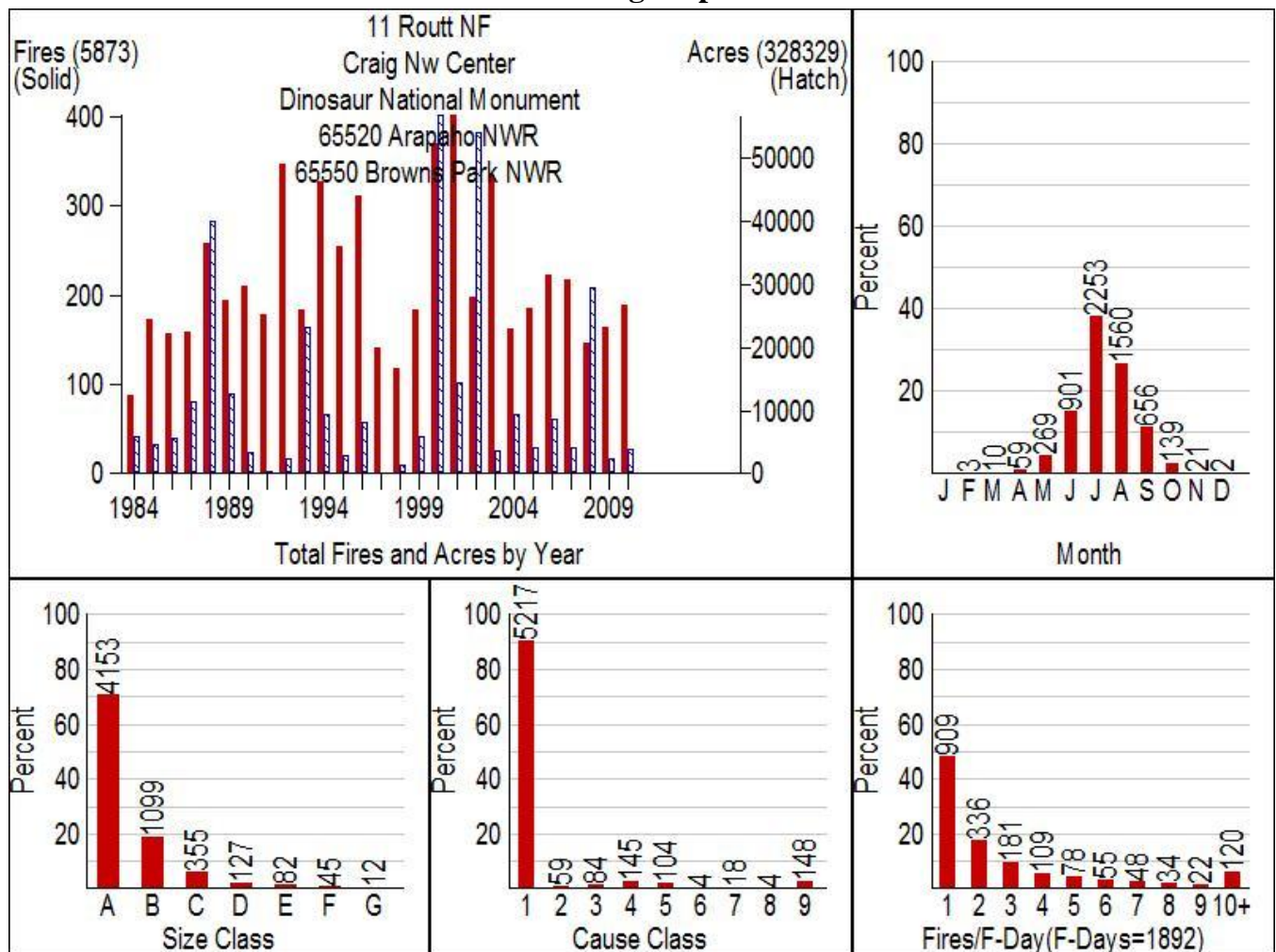
Dispatch Level Decision Points (South Zone FDRA)



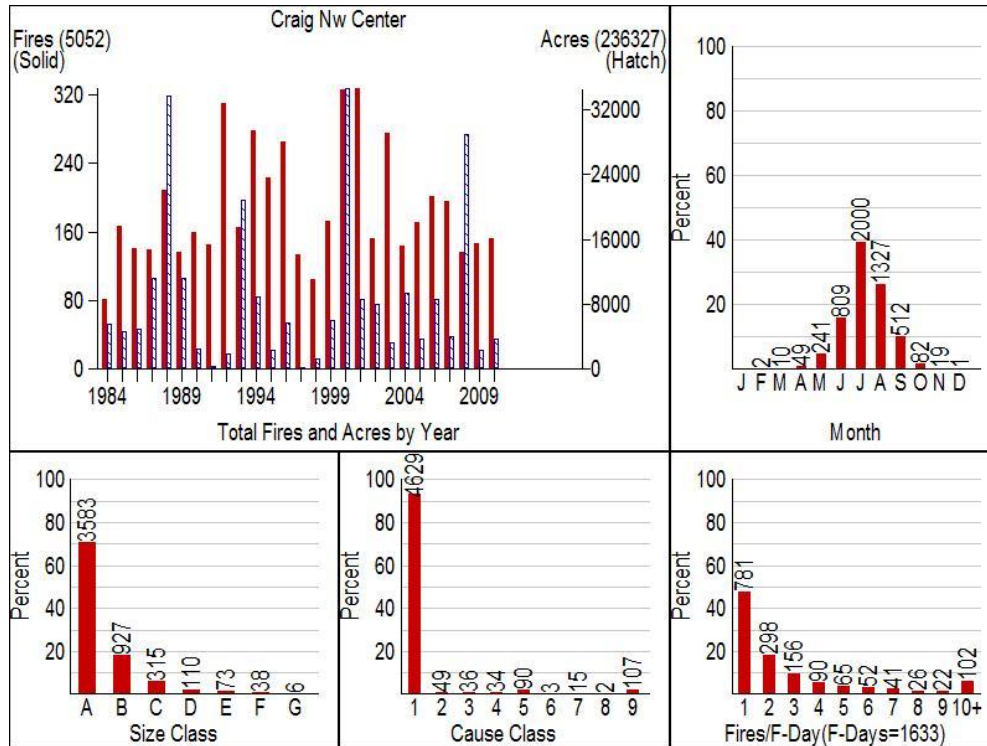
Appendix K—Fire Occurrence (by Agency) Less State and County Fires

FireFamily Plus Database (1984-2010) Craig Interagency Fire Center				
Agency	# of Fires	% of Total Fires	Acres Burned	% of Total Acres
BLM	5052	86%	236,327	72%
Fish and Wildlife	29	.4%	18,229	5.6%
Routt NF	450	7.7%	46,193	14%
NPS Dinosaur	342	5.9%	27,580	8.4%
TOTALS	5873	100%	328,329	100%

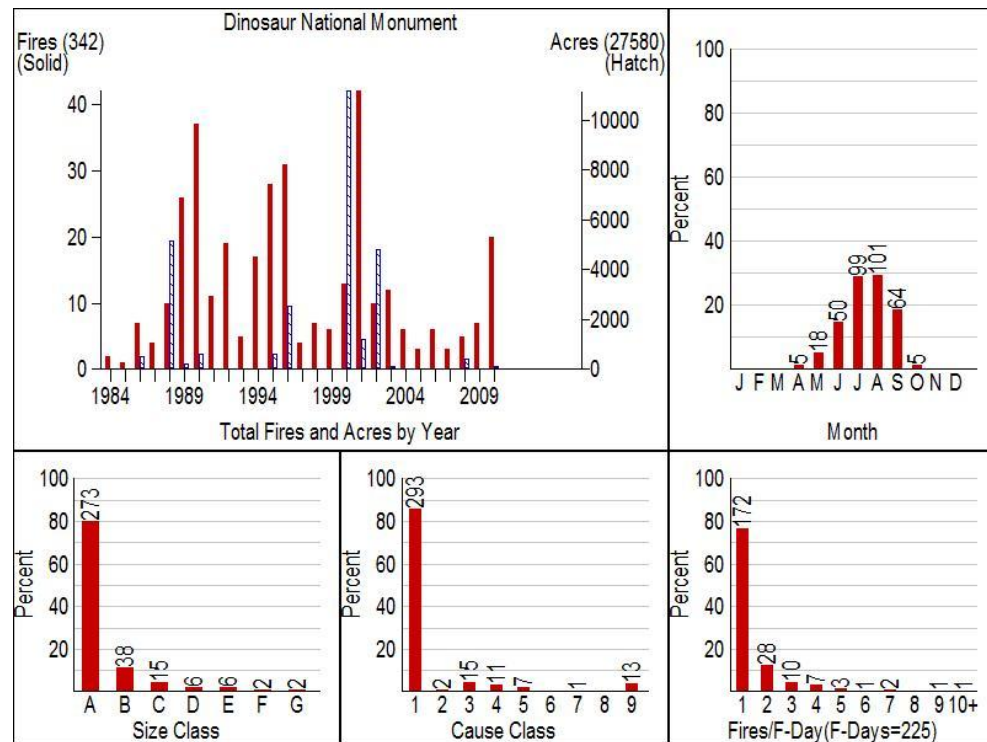
All Fires within Craig Dispatch Area



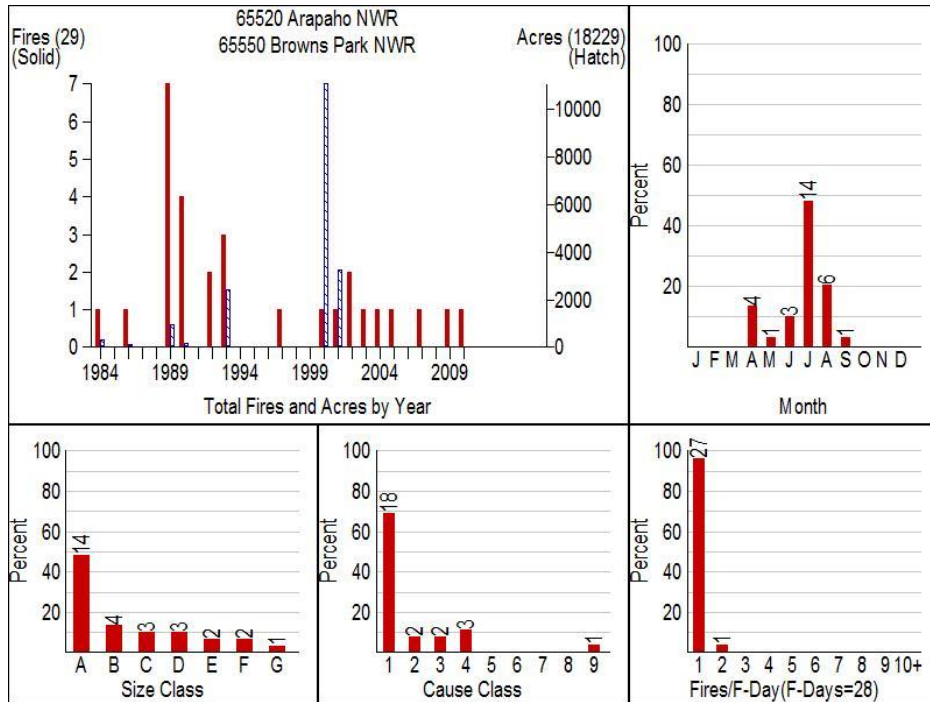
Northwestern Colorado BLM Fires



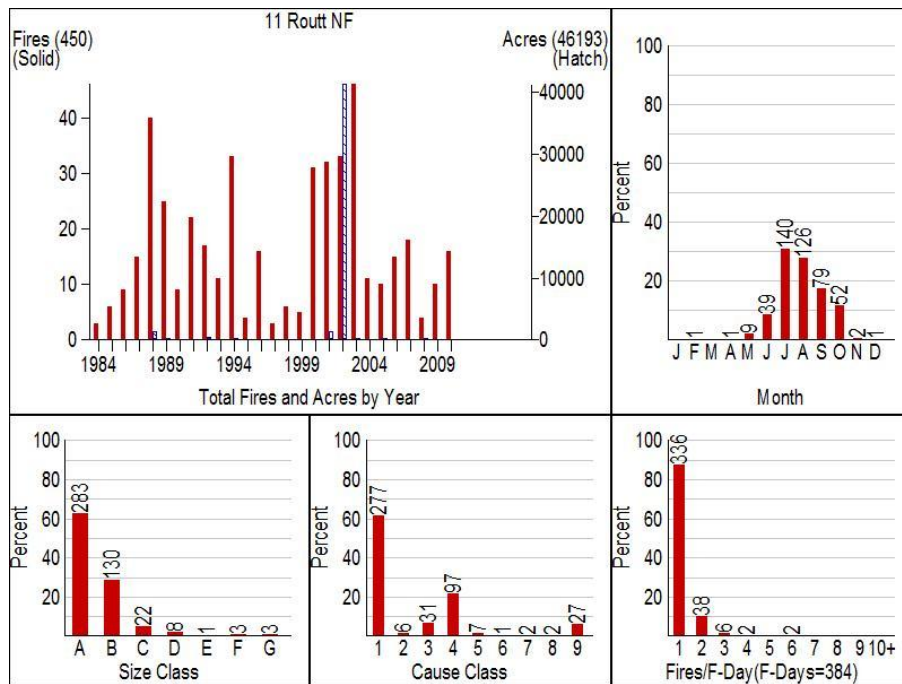
Dinosaur National Monument Fires



US Fish and Wildlife Service

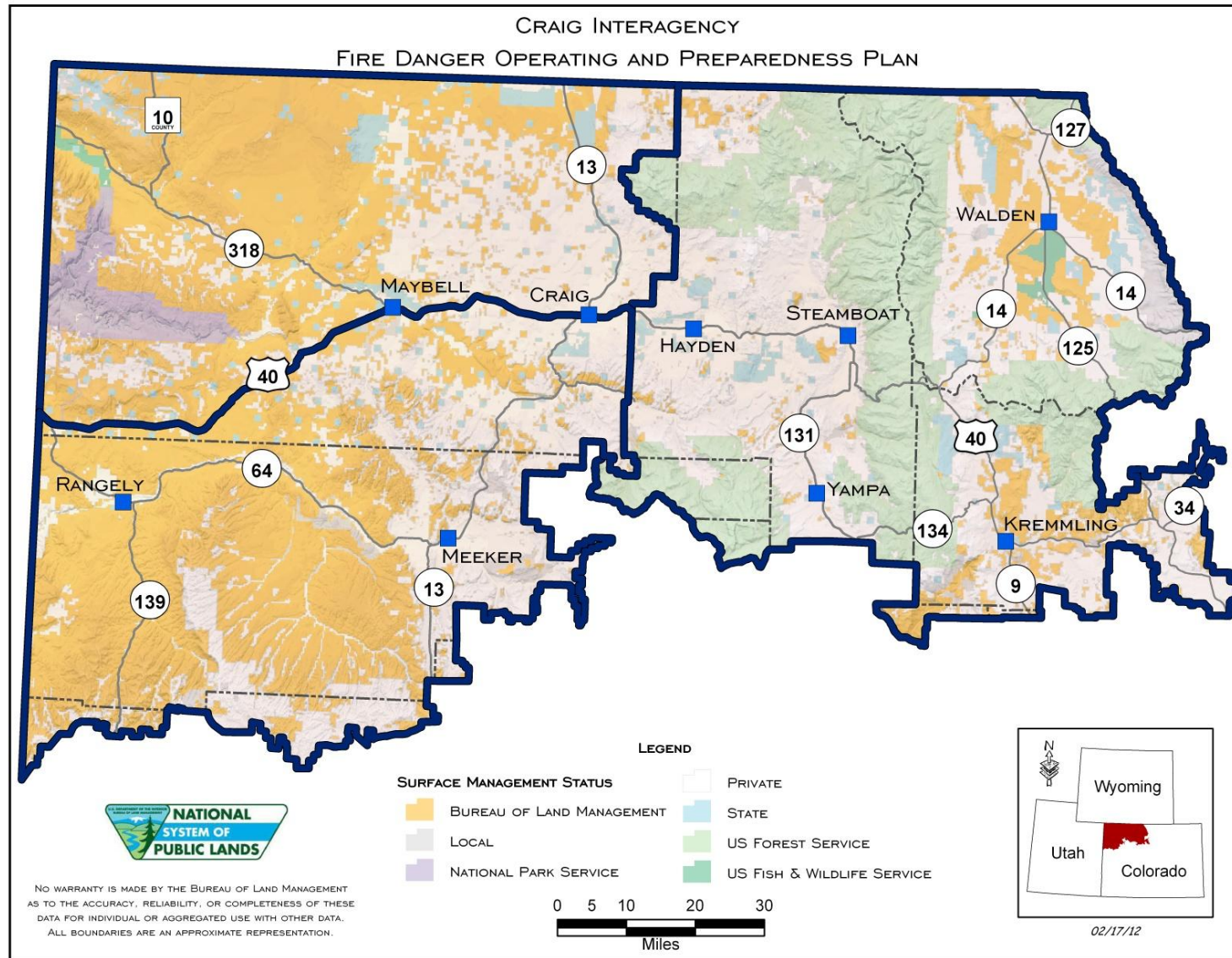


Routt Portion of the MBR

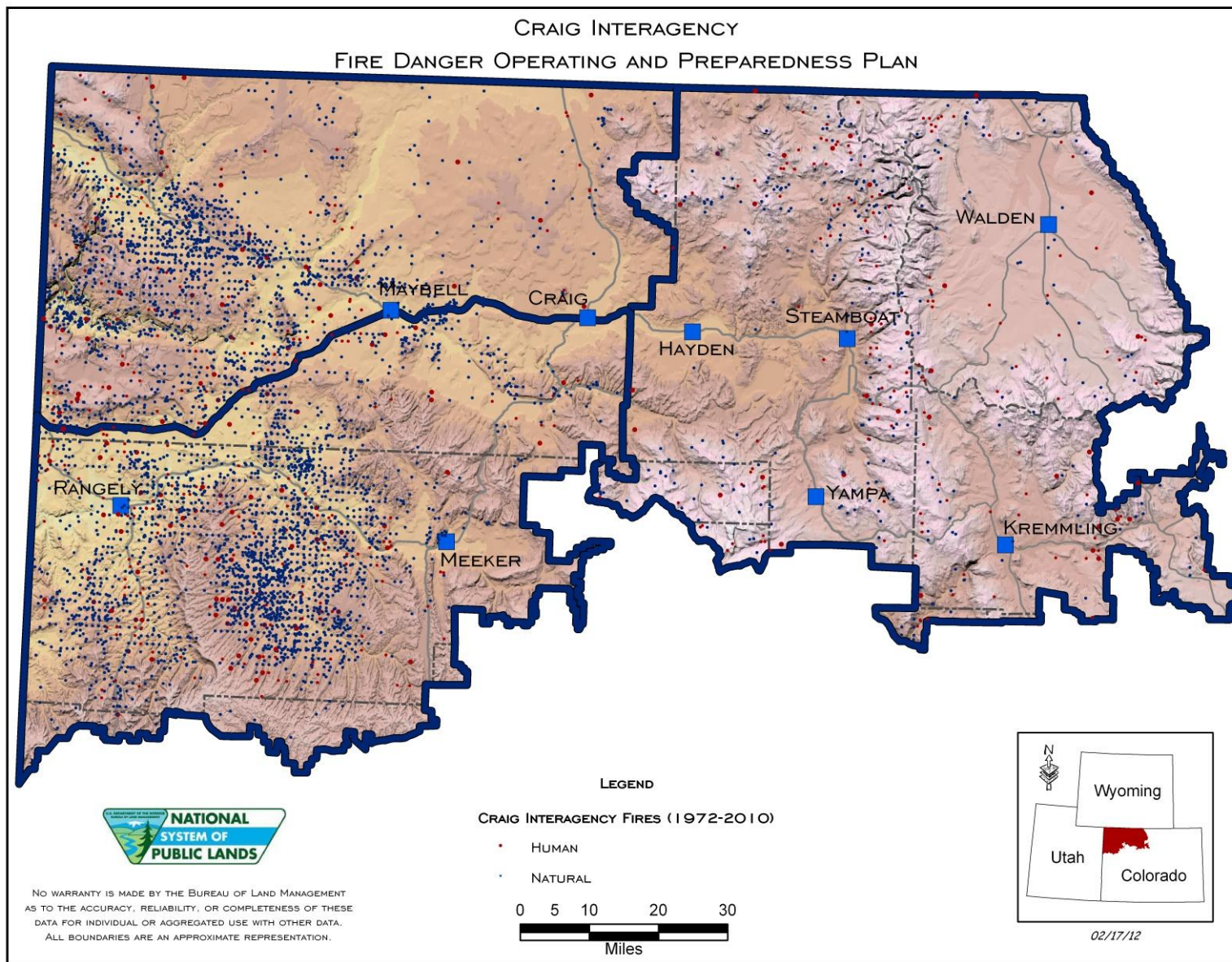


Appendix L –Maps

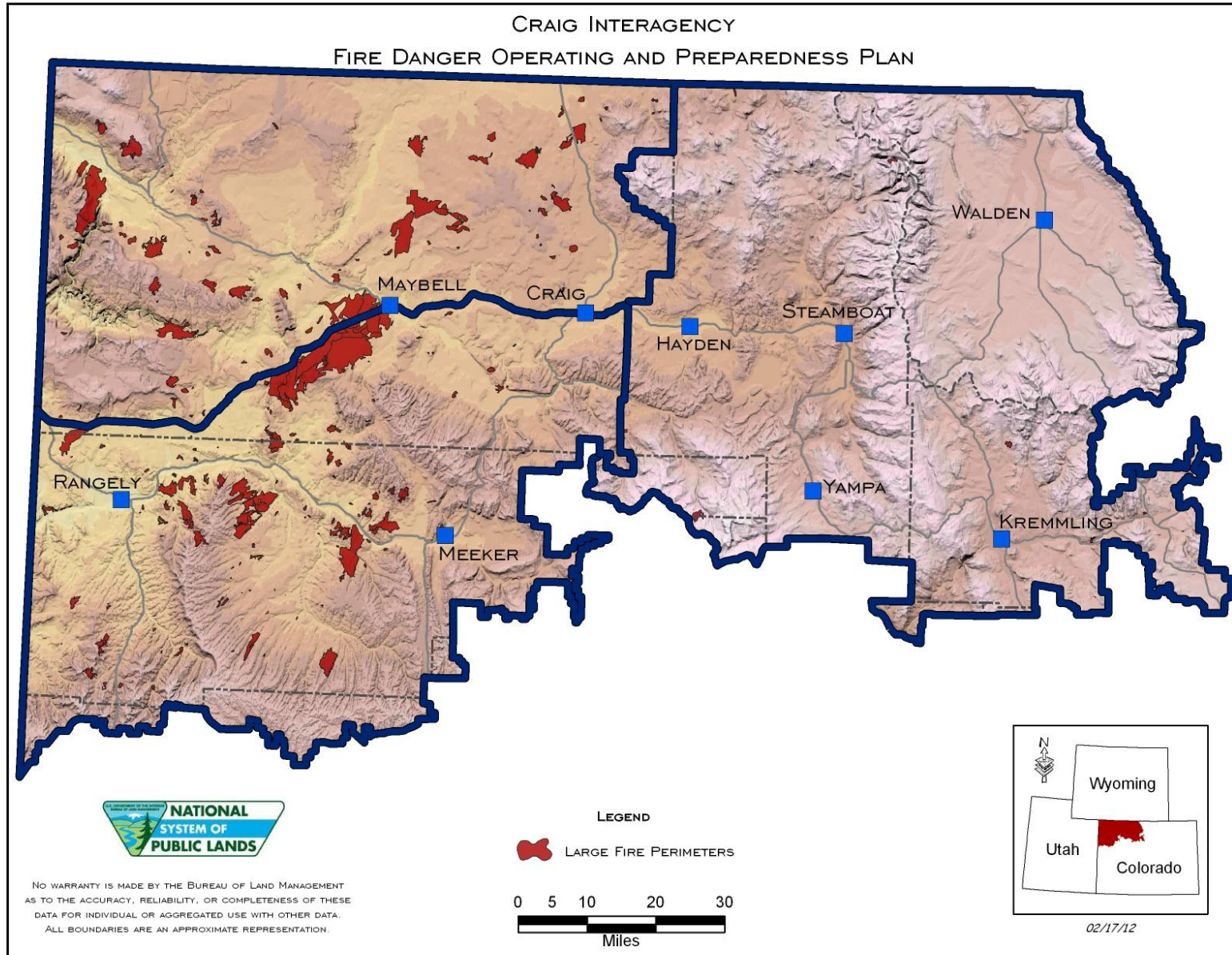
Fire Danger Rating Area Ownership Map



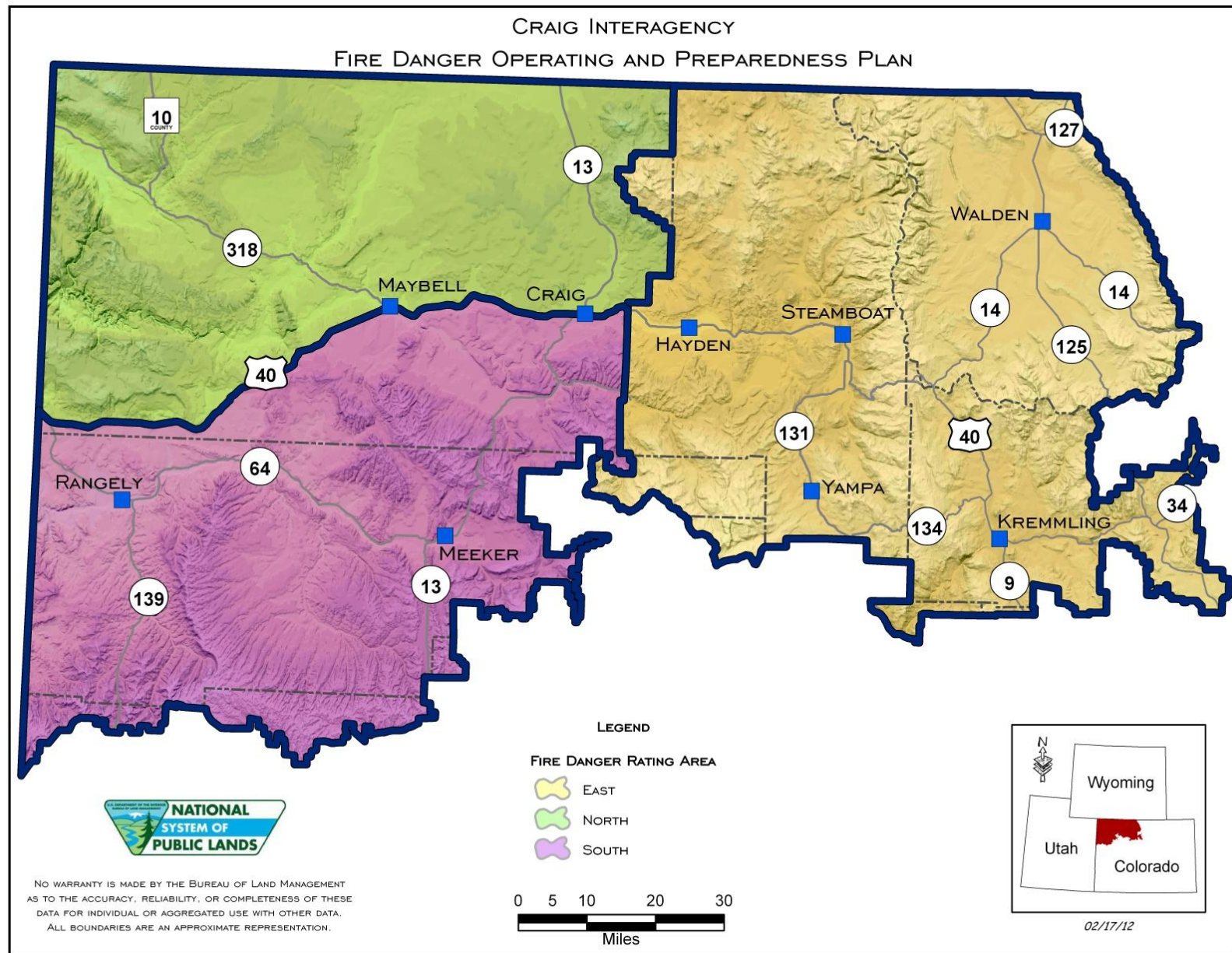
Point Layer Fires both Human and Lightning Excluding State and County Fires



Large Fires Excluding Forest Service, State and County Fires

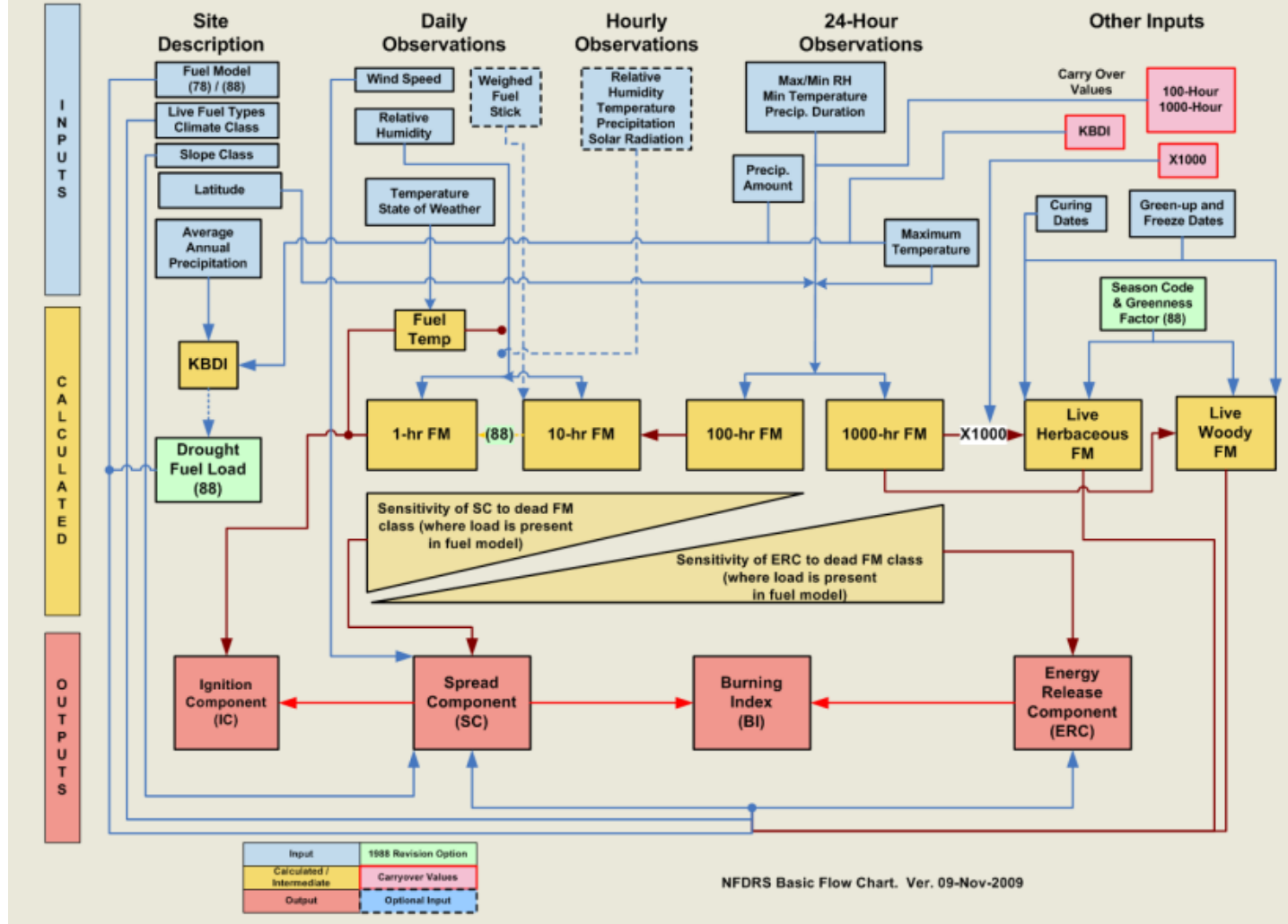


Fire Danger Rating Areas



Appendix M--NFDRS Structure

National Fire Danger Rating System



Appendix N—BLM State Director Severity Request Procedures Emergency Preparedness Step-Up Plan

To be completed later